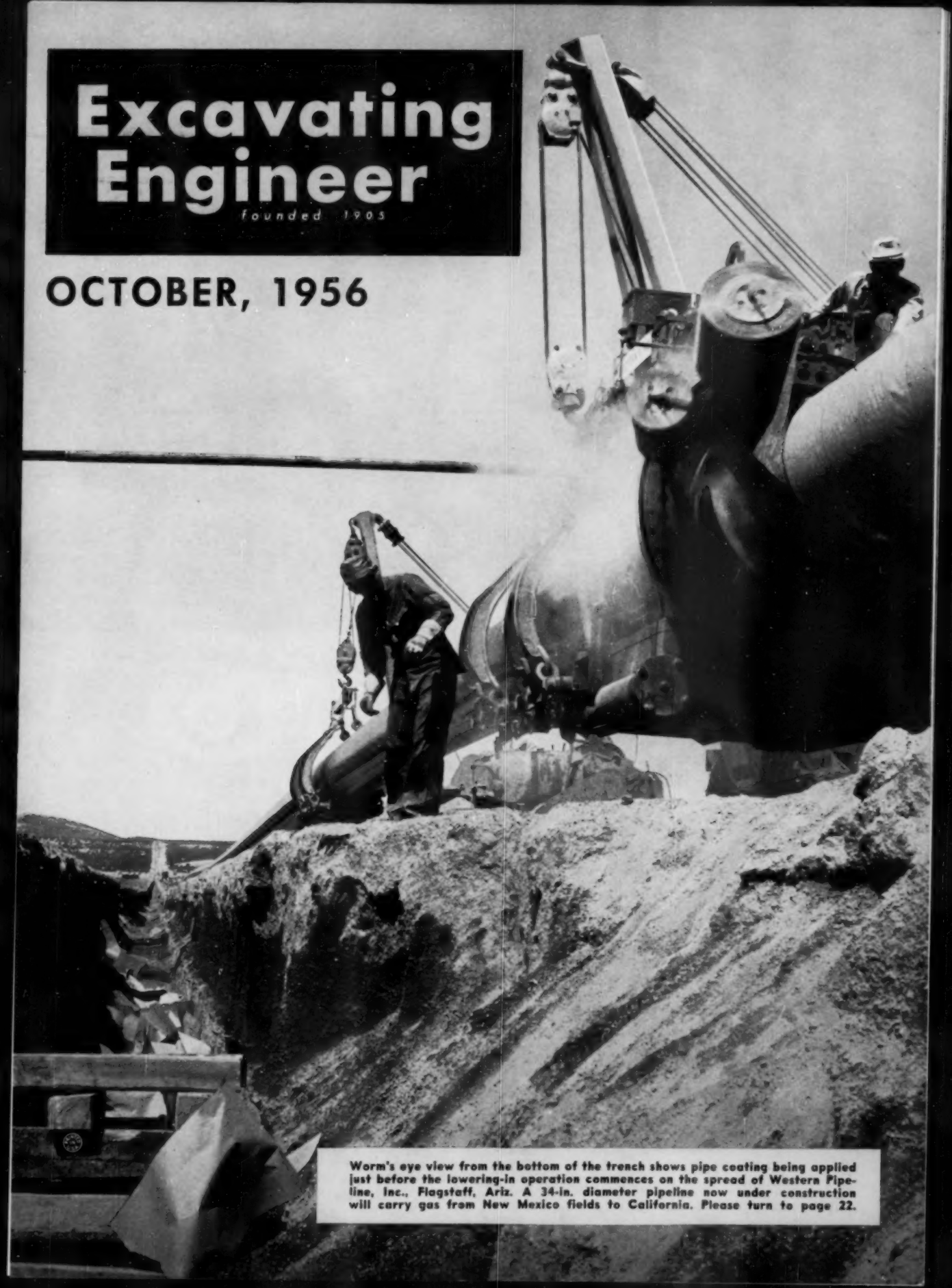
Excavating Engineer

founded 1905

OCTOBER, 1956



Worm's eye view from the bottom of the trench shows pipe coating being applied just before the lowering-in operation commences on the spread of Western Pipeline, Inc., Flagstaff, Ariz. A 34-in. diameter pipeline now under construction will carry gas from New Mexico fields to California. Please turn to page 22.

Near Candlestick Point, outside of San Francisco, a 6-yd. 150-B loads borrow to help build a new freeway.

in California . . . and the World Over

Match big construction jobs with big-production equipment — Bucyrus-Erie Electric Shovels

When construction jobs call for big yardage in extra tough digging, the advantages of a Bucyrus-Erie electric shovel are more valuable than ever. Because these heavy-duty excavators are built to handle even the most demanding jobs, they can be expected to keep dirt-moving costs down in *any* work.

Modern front-end design reduces power-wasting deadweight, yet provides plenty of strength. Heavy-duty construction throughout holds down upkeep, lets you get maximum working time out of every shift. Ward Leonard variable-voltage control provides high speed acceleration and deceleration, assures maximum torque and power when it's needed most.

On future jobs, figure the savings you can expect from Bucyrus-Erie Ward Leonard electric shovels. They are helping make a profit for more and more contractors.

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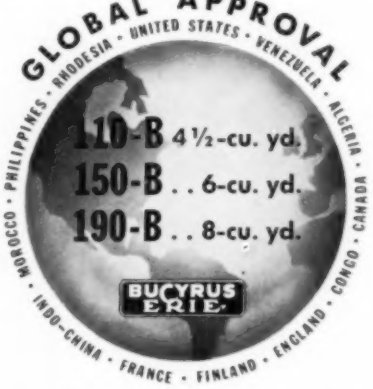


BUCYRUS-ERIE COMPANY

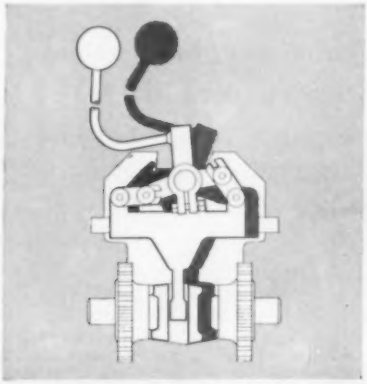
South Milwaukee, Wisconsin

Report from the Dallas-Fort Worth Turnpike Job

"The Allis-Chalmers Forty Five motor grader has the

BEST CONTROLS I'VE EVER TOUCHED"

That's what veteran motor grader operator R. C. Fryer of Telephone, Texas, says about the new mechanical, toggle-type control levers on the Allis-Chalmers Forty Five motor grader he is operating for the J. C. Watson Construction Co., Dallas, Texas.



FORTY FIVE
120 brake hp • 23,800 lb

And here's why Fryer is so enthusiastic. Toggle-type controls move gears into operating position surely, quickly when operator moves lever . . . but with *no* wrist-snapping kickback. Levers stay put—can't fight back. With no backlash to worry about, Fryer does precision jobs faster and easier.

You've got to see it to believe it

R. C. Fryer is a veteran of the four-mule Fresno days, and his enthusiasm is proof that the Forty Five is motor grader news worth looking into. Check and you'll find toggle-type controls are only one of many features that mean new performance and new operating ease.

The big Allis-Chalmers diesel engine provides real lugging ability. The ROLL-AWAY moldboard rolls the load instead of pushing it . . . moves it faster with less effort. Fully enclosed power steering, new accelerator-decelerator pedal, real operator comfort, excellent visibility, all add up to the kind of production and long-life service you want.

See the Forty Five. Try the Forty Five. Find out for yourself the many advantages that will help you get top performance and big production on your jobs.

Your Allis-Chalmers dealer has complete facilities to serve you—factory-trained sales and service personnel, factory-approved service equipment and complete stocks of True Original Parts.

ROLL-AWAY is an Allis-Chalmers trademark.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

FOR THE BIG ROAD PROGRAM . . .

RAISE YOUR SIGHTS TO **M-R-S BIGGER CAPACITY**

LARGER CAPACITY M-R-S EQUIPMENT LOWERS YOUR COSTS PER YARD OF DIRT MOVED BY ATTACKING HIGH OPERATING COSTS THE FOLLOWING FOUR WAYS:

1 *GREATER HAULING CAPACITY* — Because of the exclusive M-R-S four axle principle, M-R-S tractors have greater hauling capacity. This means more pay yards per cycle—lower labor, operating costs and overhead to charge to each yard of dirt moved.

2 *LOWER INITIAL INVESTMENT* — Higher capacity M-R-S equipment means fewer units required to do the job—lower investment per yard of struck capacity. Furthermore, the contractor who already owns several good four-wheel scrapers can put them to work with M-R-S tractors with substantial savings over the cost of a complete new tractor-scraper unit.

3 *EXCLUSIVE VERSATILITY* — M-R-S tractors can be quickly detached from the scraper and used for powering four wheel bottom-dump wagons up to 42 c.y. capacity, four wheel end-dump wagons up to 38 c.y. capacity, extra heavy sheepfoot and rubber tired rollers.

4 *DEPENDABILITY* — Rugged M-R-S tractors and their MATCHED allied equipment are expertly designed and manufactured for thousands of continuous hours of profitable trouble-free service. M-R-S owners are chalking up new records of mechanical performance with trouble-free M-R-S equipment.

See you at the ROAD SHOW
CHICAGO
Jan. 28-Feb. 2, 1957

Investigate Before You Invest!

Bigger Capacity, Peak Production and High Profits Go Hand in Hand!

The new federal highway construction program promises more construction work than any comparable period in the history of the country. This work is "big game" for the earthmoving contractor—"game" that should be hunted with "big guns."

Raise the calibre of your earthmoving spreads with rugged, dependable M-R-S higher capacity equipment and you can "bag the limit" of profitable business.

See Your M-R-S Dealer Today!

THE EMBLEM OF DEPENDABILITY
M-R-S MANUFACTURING COMPANY

FLORA, MISSISSIPPI, U. S. A.

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Excavating Engineer

founded 1908

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Ouija boards are passé

Time was, when a person had a question, out would come the ouija board for an answer. This wasn't too accurate a system, of course . . . but a lot of people put a lot of faith in what the ouija board told them.

Times change — and today accuracy is the keyword. That's why the modern business publication wants its circulation audited.

In joining BPA* the publisher is taking an important step toward sound and accurate planning in your behalf. It means that he is checking, double-checking and constantly rechecking —

- **Who you are**
- **Where you work**
- **What your job is**

He wants and needs this information — and the BPA* audit can assure both him and his advertisers that he is getting his magazine into the hands of people *qualified by their common interests* to receive it. It helps him to give you —

- **Editorials that will *help you in your work***
- **Advertising that will *have value to you***

He can serve you even better if you will complete surveys and questionnaires which he may send you, and if you will give him your thoughts and opinions on the editorials and advertisements in his magazine.

You, the reader, are the *key person* to the publisher — and the BPA* audit helps him in his never-ending effort to think about you and design his magazine for you.

You, the reader, benefit when the circulation of a publication is audited by . . .

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Leads the way on another Turnpike!

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S80-10-1

OVER HALF THE SHOVEL EQUIPMENT ON THE WEST VIRGINIA TURNPIKE WAS NORTHWEST

WELL OVER 100 NORTHWESTS —MORE THAN ANY OTHER MAKE —ON THE NEW YORK THRUWAY

OVER 20 NORTHWESTS ON THE MAINE TURNPIKE EXTENSION

57 NORTHWESTS—MORE THAN ANY OTHER MAKE — ON THE MASSACHUSETTS TURNPIKE

OVER 60 NORTHWESTS—MORE THAN ANY OTHER MAKE—ON THE OHIO TURNPIKE

BUILD BETTER ROADS FOR A GREATER AMERICA

PLAN TO BE AT THE A.R.B.A. ROAD SHOW CHICAGO JAN. 28—FEB. 2, 1957

PRODUCTION PLUS $ MEANS MONEY

NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

The Euclid TC-12 gives you more work-ability than other Crawlers

The first really new tractor concept in years... with ALL the performance features you've wanted

Euclid's Model TC-12 Twin-Power Crawler establishes an entirely new standard of tractor performance. It's built to deliver unequalled drawbar horsepower, easy operation and a smooth, steady flow of power to meet any job requirement. It provides easy accessibility of all major components and all lubrication, check and adjustment points are located for maximum convenience. Unitized assemblies permit service or removal without a major tear-down of other parts.

Powered by two 194 h.p. engines at rated speed, 365 h.p. is delivered to the power train. Each of the tracks is driven independently through separate Torqmatic Drives giving the TC-12 faster, easier steering and greater drawbar pull at higher speed. There's no clutch—shifting from one of the three speed ranges to another is done under full power —top speed in forward or reverse is 8.3 mph.

Have your Euclid dealer give you all the facts on the TC-12—compare with your present big tractor equipment and you'll know why so many owners have proved that *Euclids are your best investment.*

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Years Ahead in Performance

on today's tough jobs!

Another job where the TC-12 proved its ability to get more work done faster—land clearing in Virginia. Excellent maneuverability in tight quarters, steady flow of power, and typical Euclid brute strength, make this Twin-Crawler a dependable top performer for this kind of big tractor work.

The TC-12 has no equal for pushloading large scrapers or pulling big earthmoving equipment. Each track is driven by a separate engine and Torqmatic Drive giving the Euclid tractor outstanding maneuverability. On their Indiana Turnpike contract, Union Builders kept the job ahead of schedule with a fleet of "Euc" scrapers pushloaded with the TC-12.

Compare the accessibility and performance of the TC-12 with your present big tractor equipment—your Euclid dealer has facts and figures from all kinds of jobs.

A. E. Dick Construction Co. is using 2 Twin-Power TC-12 "Eucs" for stripping overburden at a big open pit anthracite operation in Pennsylvania. Tremendous power and traction, unequalled in any other crawler, gives them more work-ability on tough jobs as well as on routine earthmoving work.

Equipped with a Tipdozer, this TC-12 proved a versatile machine on a big subdivision grading job. It pushloaded a fleet of big Euclid scrapers—getting heaped loads of 21 and more yards in a hurry—and did a lot of land leveling and clean up work itself.

Cadell and Oman put their first TC-12 to work pushloading "Euc" Scrapers on a 3 million yard railroad job in Georgia. Independent track drive, good visibility for the operator and power matched to the job requirement enables the TC-12 to maintain maximum scraper production.

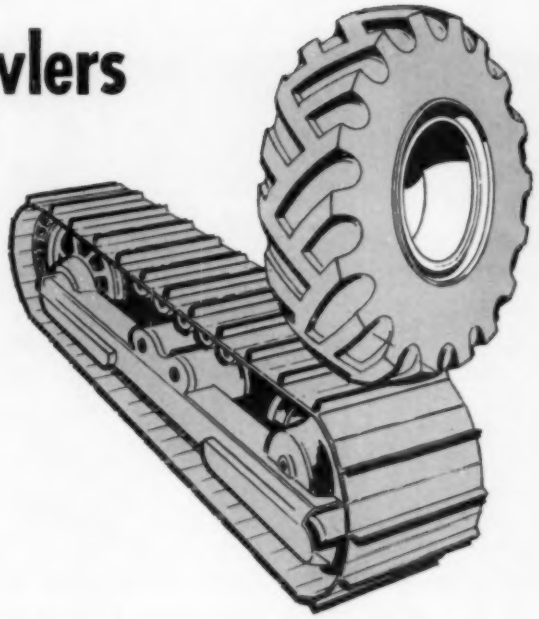
Easy operation of the TC-12—Torqmatic Drive eliminates master clutch and manual gear shifting—makes this "Euc" a high production machine. For a relocation project on U. S. Route 16 in Michigan, Sugden and Sivier used a cable controlled blade for dozing.

EUCLID DIVISION GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

See us at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957

There's a place for crawlers and a place for rubber

in meeting your dirtmoving problems.

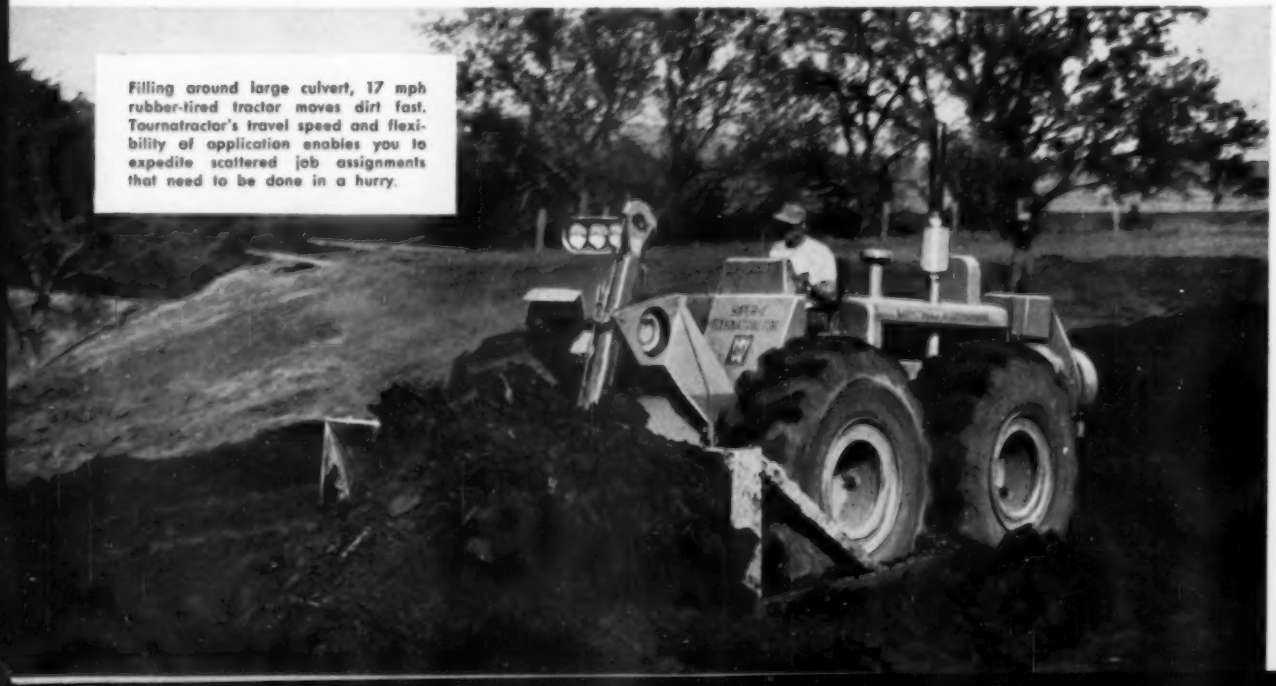


1. **Larger job yardage**
2. **Increased job area**
3. **Earlier completion dates**
4. **Higher labor costs**

Crawler tractors fit your applications where lugging power is a maximum requirement. They have maximum efficiency in limited-area operation. Here their traction advantage at low speeds can offset their speed limitations on medium or long-range cycles.

Rubber-tired tractors fit your applications where speed and mobility become important dimensions in your dirtmoving problem. The longer your cycle the greater the importance of speed that only rubber-tired tractors can give. You also need rubber-tired mobility where frequent moves from one assignment to the next, or from job-to-job, are involved. Where you have long cycles and/or frequent moves, crawler limitations give you a severe handicap in both time and cost.

With over ten years of experience and development behind it, our improved rubber-tired Tournatractor, can meet your need for dependable performance, with a minimum of competent regular maintenance. Operation is easy and safe. When inspection or re-



Filling around large culvert, 17 mph rubber-tired tractor moves dirt fast. Tournatractor's travel speed and flexibility of application enables you to expedite scattered job assignments that need to be done in a hurry.

pairs are necessary all parts are easily accessible and can be replaced quickly and simply.

Take a new look at the modern Tournatractor. Study it from the angle of your assignments where you need new standards of speed and mobility. Remember, these two dimensions will become even more important in the big highway programs ahead. Study your crawler cycles, but not just on basis of the biggest load in the shortest distance. Measure in *time* rather than *distance*. Measure load-time, carry-time, return-time. Find out the percentage of time you lose in moving from one assignment to the next.

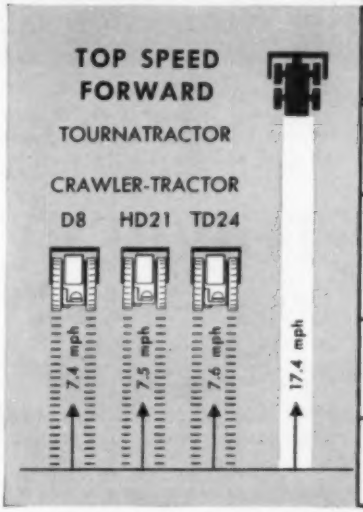
You measure production on your scrapers, your shovels, your pavers, your drills. It's also important for you to carefully study the one major tool you've probably taken for granted . . . your tractor. To be sure, yardage measurements are impossible on most of their production . . . but you can definitely time their moves and cycles over a substantial period; to your advantage.

We'll be glad to help you set up these studies if you wish. Then, when you know just what you are now getting in tractor performance, we'll be glad to show your time-study man similar operations on Tournatractor. We think the answers on the present-day Tournatractor will justify your trying at least one on your current jobs. Time-studies on assignments calling for speed and mobility will show you a big advantage in productive time . . . more work done . . . lower costs . . . greater profit.

But don't take our word for it . . . check for yourself.

Tournatractor—Trademark Reg. U.S. Pat. Off. CT-1103-G

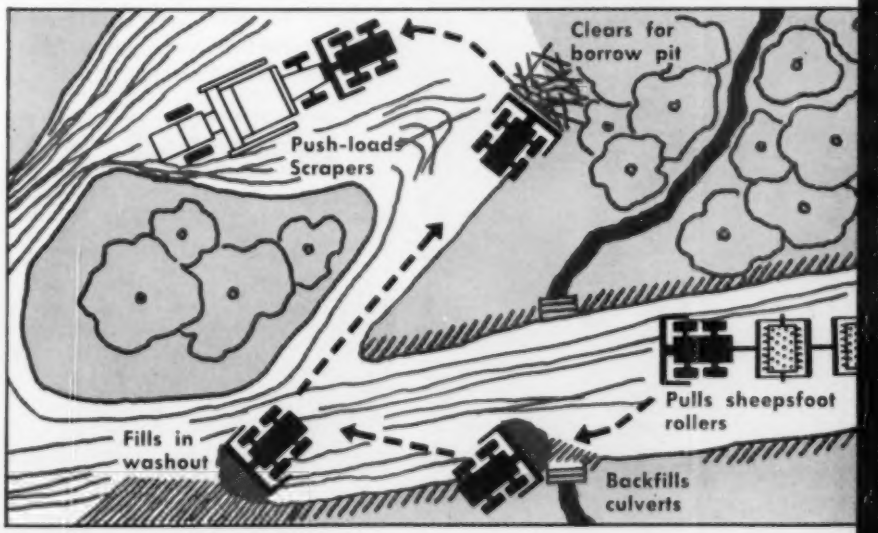
Push-loading is an important job where rubber-tired speed pays off. Tournatractor's ease-of-operation and maneuverability allow fast positioning, gear-shifting is faster, new optional wide-base tires plus hydroflation give improved performance. Mobility permits pusher transfer to match loading need.



Work	Operation	Time (minutes) Average Crawler	Rubber-Tired Tractor	Speed Saved in Min.
Dozing	Pushing load . . 150 ft.	0.86	0.57	
	Return . . . . . 150 ft.	0.36	0.21	
	Gear changes	0.30	0.10	
	TOTAL	1.52	0.88	0.64
Pulling 15-yd. Scraper	Loading	0.75	1.25	
	Hauling . . . . . 1000 ft.	2.10	0.76	
	Spreading	0.40	0.40	
	Return . . . . . 1000 ft.	2.10	0.63	
	Gear changes	0.30	0.10	
	TOTAL	5.65	3.14	2.51
Push-loading	Loading	0.85	1.10	
	Return	0.42	0.21	
	Gear changes	0.30	0.10	
	TOTAL	1.57	1.41	0.16
Pulling 20,000# Roller	600-ft. cycle travel . .	3.40	2.72	
	turns	0.30	0.30	
	TOTAL	3.70	3.02	0.68

Tournatractor travel-speed advantage is shown above. Chart compares Tournatractor's top speed with those of 3 crawler-tractors in its size range. Diagram below shows why EVERY spread needs at least one Tournatractor as a trouble-shooter. In less than 5 minutes this 17 mph rig can be at work on a new task a mile down the right-of-way. It can handle 9 one-hour assignments averaging a mile apart in a single 10-hour day.

Figures computed from manufacturers' specification sheets available to us at time of printing.



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

ARBA

See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

In Pennsylvania . . .
the Marsolino Construction Co., Uniontown, Pa., uses this ¾-yd. 22-B on turnpike extension work near Center Square. Quick-fill, easy-dump dipper and good maneuverability are two of many features that make the 22-B a profitable machine to own.

In Washington . . . this 1½-yd. 38-B cuts access road through wilderness of Olympic National Park for Bureau of Public Roads. Machine is owned by Hugh Govan, Port Angeles. Heaped dippers and fast cycles make Bucyrus-Eries ideal for road construction work.

TOP PERFORMERS...

On roadbuilding jobs all over the country

Wherever Bucyrus-Eries work they are standouts for high output and dependable, long-life service. Such performance on the job results from close attention to quality in the factory, where research and design, testing and manufacturing aim for perfection in every detail.

All the castings that go into these machines are poured in Bucyrus-Erie's own foundries under careful laboratory supervision which holds them to the highest standards. Modern forging and heat treating methods assure the strength, toughness, and hardness demanded for heavy field duty. Through individual design, working parts are combined into machines with the right balance of weight and power to handle their rated capacity most efficiently.

For more information on what the high-quality manufacturing of Bucyrus-Eries can mean to you, call, write, or see your nearby Bucyrus-Erie distributor soon. Capacities range from ⅜- to 4-cu. yds. 200E56C

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

Attend the ROAD SHOW • CHICAGO, Jan. 28 - Feb. 2, 1957

In Massachusetts . . .
S. J. Groves & Sons use this 4-yd. 88-B to load blasted rock for the Massachusetts Turnpike project near Blanford. The 88-B has a twin rope balanced crowd system that permits operator to obtain the most effective dipper speed when both hoist and crowd are needed — providing great digging force. All Bucyrus-Erie components are arranged for easy maintenance.

In Colorado . . .
this 38-B loads granular base material for state highway department on job near Monte Vista. The Pioneer Construction Company of Pueblo is the owner of this machine.

In Georgia . . .
this ½-yd. 15-B digs fill near Flintstone for state highway department. Fewer parts, anti-friction bearings, superior materials, and careful coordination of working parts puts every pound of weight to work . . . makes the 15-B most efficient in its size range. The machine pictured is owned by W. J. Coulter, St. Elmo, Tennessee.

In Kentucky . . .
this 3-yd. 71-B loads trucks at one stretch of the Kentucky Turnpike. Its owner is Traylor Brothers Contracting Co., Evansville, Ind. Power and coordination to handle heavy rocks smoothly and efficiently make the 71-B truly a "big league" performer.

"Saves us many hours"

says Wisconsin Contractor

"The Adams power-shift moldboard gives grader long reach—*fast*," said Phil Frank, partner in Frank Brothers, Milton, Wis. "Grader does not have to be maneuvered out of its line of travel for extra blade reach when sloping banks, grading shoulders, etc. This saves us many hours. It's the best grader I have seen for cutting backslopes."

Frank Brothers used their Adams "660" along with 4 C Tournapulls on a project relocating 1½ miles of Wis. Hwy. 58, six miles south of Mauston. Part of this job included building a ditch to change the course of a stream which intersected the right-of-way. The grader patrolled the haul roads, finished backslopes, scarified sandstone rock for scrapers, leveled fill, handled finish-grading.

One-piece frame resists shocks

The heavy, box-construction, one-piece, streamlined frame of this husky grader is built to resist load shocks and stresses. Weight is distributed to make use of full power in all gears. Big, powerful engine starts quickly in any temperature; has lugging ability to move heavy loads. Constant-mesh transmission gives smooth speed through all gears.

8 Forward speeds . . . to 26 mph

There's a speed to fit the work load of every grading operation. This means more applied power, greater accuracy. You get work done fast, save time moving job-to-job. Three additional "creeper speeds" (.23 to 1.82 mph) are optional. These "slow-motion" speeds make it easy to rip hard-packed roads and old asphalt, root out unseen roots and stones without severe shocks, give you accurate finishing in tight places.

4 Reverse speeds . . . to 13 mph

Wide range of reverse speeds saves time on shuttle-grading and mixing, backing to buck snow drifts, etc. *No other grader offers this wide range of operating speeds.*

Double-action hydraulic brakes

Service brake applies braking action to transmission as well as wheels; surer, safer stops are possible, with less pedal effort.

Rubber-mounted engine

Vibration is not transmitted through floor to machine and operator. Means less maintenance, better operator efficiency all day long.

See Adams before you buy

Select your next motor grader on the basis of *performance*. Ask your LeTourneau-Westinghouse Distributor for performance facts and specifications. Learn why Adams graders do *more* work, in *less* time, at *lower* cost. You be the judge!

Keeping haul road open, "660" grader leveled ruts at high speed, made it easy for scrapers to maintain high production. Job was one of many Adams grader handled on this highway job.

High-angle blading of ditches found Adams "660" holding steadily to contour. Blade held precisely to cut with equal pressure at all points.

A size ADAMS for every need

Model 660—150 hp diesel engine, 27,730 lbs.
Model 550—123 hp diesel engine, 23,500 lbs.
Model 440—104 hp diesel engine, 21,500 lbs.
Model 330— 80 hp diesel engine, 20,500 lbs.
Model 220— 60 hp diesel engine, 14,865 lbs.

TravoLoader—A high-speed, heavy-duty, self-propelled, belt-type loader for picking up materials and loading into trucks from windrows or stockpiles. Your choice of 55 hp gasoline or 60 hp diesel engine, 16,800 lbs.

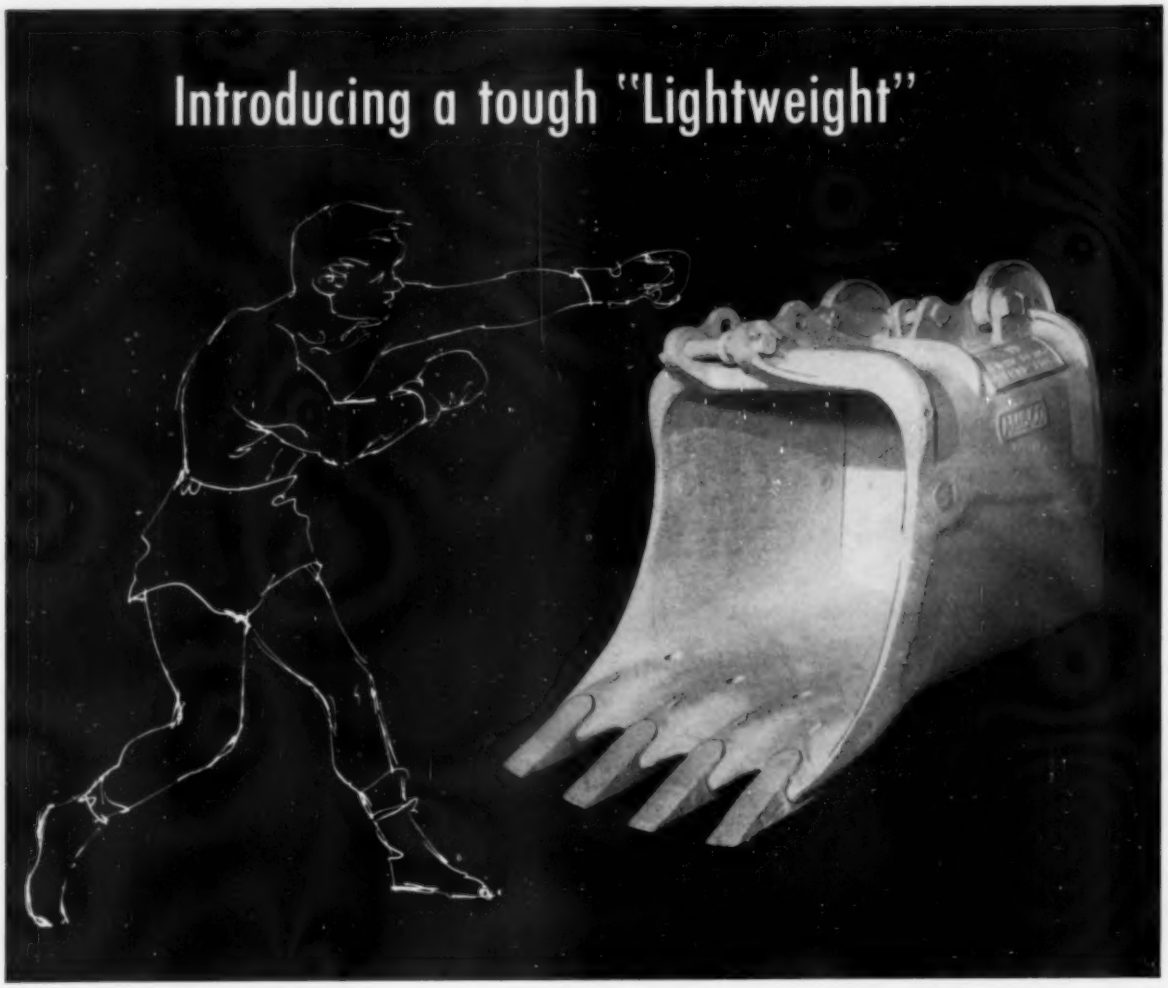
AG-8-G-bw

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

ARBA

See you at the ROAD SHOW • Chicago • January 28-February 2, 1957



NEW Amsco® Manganese Steel LIGHTWEIGHT DIPPER

Rugged 3/4 yd. dipper, made of the "toughest steel known," actually work-hardens under impact

Those big, tough Amsco Dippers now have a smaller brother. With this new, rugged, lightweight dipper, small shovel operators can enjoy the combined advantages of long-wearing manganese steel and proved Amsco design features, such as:

- One-piece manganese steel back castings
- Arch formed by complete box section for maximum strength
- Teeth are set for clean, fast digging
- Interior is designed for rapid dumping
- Lugs for handle, back, and braces are cast integral with back—for extra strength
- 25% lighter than standard Amsco 3/4 yd. dipper, permitting use on light-duty shovels and allowing their developed power to be more fully utilized
- Curved door in back, for full-capacity loading with each pass

Ask your shovel manufacturer for full information—or write us direct for descriptive literature.

"Vital Statistics" on this new lightweight champ

Height of front over teeth	4 ft. 3/8 in.
Height of back	2 ft. 7 in.
Opening at top	2 ft. 5 in.
Opening at bottom	2 ft. 7 in.
Approximate weight	1550 lbs.

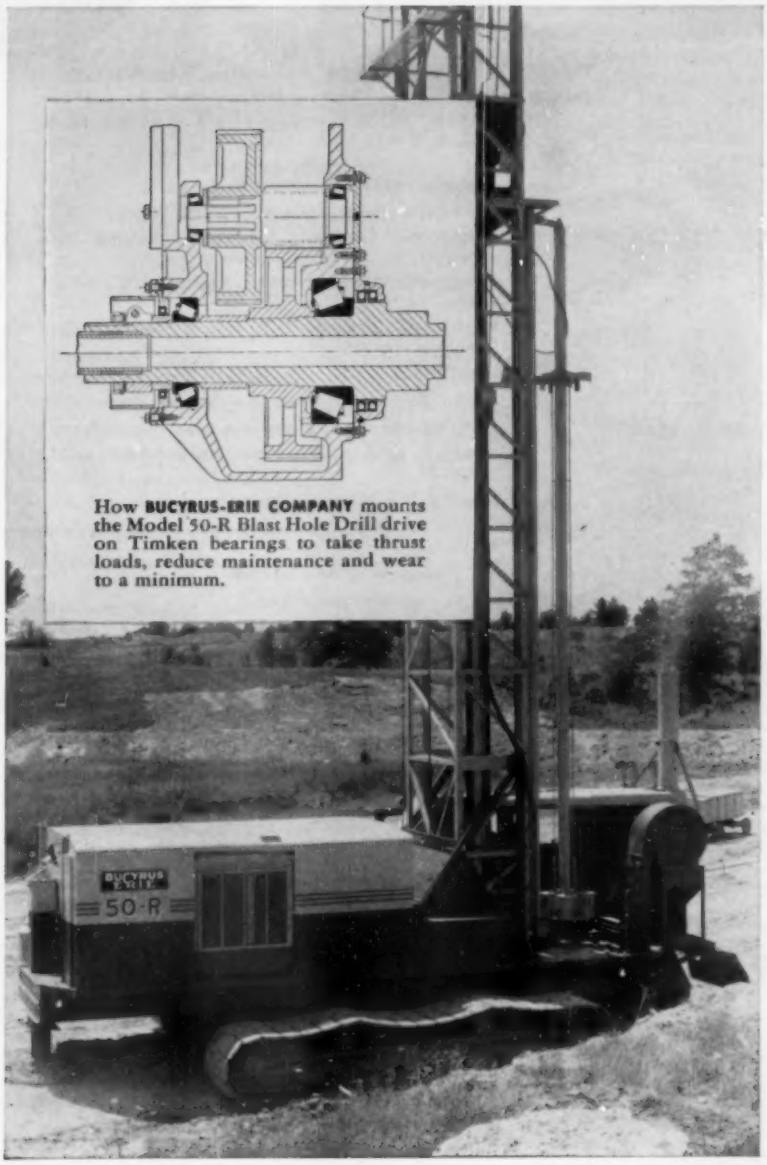
AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division · Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DELAWARE, OAKLAND, ST. LOUIS, JOLIETTE, QUEBEC

TIMKEN® bearings help massive rotary drill take big blast holes in stride



How **BUCYRUS-ERIE COMPANY** mounts the Model 50-R Blast Hole Drill drive on Timken bearings to take thrust loads, reduce maintenance and wear to a minimum.

DEVELOPED to meet demands for a big hole rotary blast hole drill, this Bucyrus-Erie 50-R can drill up to 12¼-inch holes with a speed never before possible. To take the terrific thrust loads on the drill bit (up to 30 tons) while drilling hardest quarry formations, and also to maintain accurate gear mesh, Bucyrus-Erie Company mounts the main and intermediate shafts of the rotary drive on Timken® tapered roller bearings.

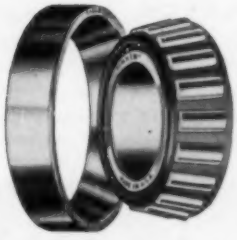
Taking heavy thrust loads is routine for Timken bearings. That's because: 1) The tapered construction enables Timken bearings to take *both* radial and thrust loads in any combination, and 2) Full line contact between rollers and races gives Timken bearings extra load-carrying capacity.

Results show up in many cost-saving ways. With Timken bearings shafts are held in rigid alignment. Gear mesh is smooth and accurate. Shaft wear is eliminated, gear wear reduced. Parts last longer and operate steadily at peak efficiency.

What's more, Timken bearing rollers and races are case-carburized to give them hard, wear-resistant surfaces over tough, shock-resistant cores.

Only Timken bearings give you so many advantages. We even make our own fine alloy bearing steel. We're America's only bearing manufacturer that does. For the most long-lasting, money-saving performance, specify Timken bearings for the machines you buy or build. Look for the trademark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. Timken fine alloy steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ↓ AND THRUST →↓← LOADS OR ANY COMBINATION ✳

LEADING DISTRIBUTORS

HANDLE BUCYRUS-ERIE and RUSTON-BUCY

ADEN: Luke Thomas & Co. Ltd., Crater.

ALGERIA: See French Union.

ANGOLA: Monteiro Gomes, Ltd., Luanda.

ARGENTINA: General Electric, S. A., Buenos Aires.

ARUBA, BONAIRE, & CURACAO: Prospero Baiz & Co., Inc., Curacao, N. W. I. (Drills only).

ARUBA & CURACAO: International General Electric, S. A., Inc., Caracas, Venezuela. (Excavators only).

AUSTRALIA: Ruston & Hornsby (Australia) Pty. Ltd., Adelaide, Brisbane, Clayton, and North Sydney.
Harris, Scarfe & Sandovers, Ltd., Perth.

AUSTRIA: Inglomark-Markowitsch & Co., Vienna.

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BELGIAN CONGO: Congo Engineering Equipment Co. (CECO) S. C. R. L., Leopoldville.

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BOLIVIA: International Machinery Co. (Bolivia) S. A., La Paz and Oruro.

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Auto Volante S. A., Belem.
Basto, Carvalho & Cia., Porto Alegre.
Carvalho S/A, Recife.
Celso Nunes, Parnaiba.
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Distribuidora Agro-Industrial Ltda., Fortaleza.
SIMTRAL Sociedade Importadora de Maquinas, Tractores e Accessorios Ltda., Bahia.
Sociedade Tecnica de Materiais "SOTEMA" S/A, Sao Paulo, Rio de Janeiro, and Curitiba.

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CAMEROUN: See French Union.

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FRENCH UNION

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— Their sub-distributors —

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CAMBODIA: Denis Freres d'Indochine, Saigon.

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FRENCH WEST AFRICA: C. O. F. A. O., Dakar, Senegal; Abidjan, Ivory Coast.

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MALAYAN FEDERATION: Harper Gilfillan & Co. Ltd., Kuala Lumpur, Selangor.

Oil Well Drills

Stripping Shovels

Water Well Drills

Crawler Cranes

Quarry & Mine Excavators

ALL OVER THE WORLD

US EXCAVATORS, CRANES and DRILLS

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Tubos y Equipos de California, S. A., La Paz. (EMSA Sub-Distributor, Territory of Baja California).
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Sanchez & Cia., S. A., Caracas. (Water Well Drills).

VIETNAM: See French Union.

YUGOSLAVIA: Intercommerce, Belgrade.

Capacities Available

General Purpose Excavators and Cranes — ⅜ to 4 cubic yards (0.28 to 3.1 cubic meters) capacity.

Hydrocranes — 4-ton crane (3.6 metric ton); ⅜ cubic yard excavator (0.28 cubic meters). 9-ton crane (8.2 metric ton); ½ cubic yard excavator (0.38 cubic meters).

Quarry and Mine Shovels and Draglines — 2½ to 8 cubic yards (2 to 6 cubic meters) capacity.

Stripping Shovels — 2 to 65 cubic yards (1.5 to 49.7 cubic meters) capacity.

Blast Hole Drills (Cable Tool) for 6, 6⅝, 9, and 12 inch (150, 170, 230, and 305 millimeter) holes.

Blast Hole Drills (Rotary) for 6¾ to 9-in. holes (170 to 230 millimeters); for 9⅞ to 12¼-in. (250 to 310 millimeter) holes.

Walking Draglines — 4 to 33 cubic yards (3.1 to 25.2 cubic meters) capacity.

Railway Cranes — 160 and 250 ton (145 and 227 metric ton) capacity.

Water Well Drills for depths of 500, 1000, and 1500 feet (150, 305, and 455 meters).

Oil Well Drills for depths of 1500, 2500, 3500, and 6000 feet (455, 760, 1070, and 1830 meters).

65Y56C

BUCYRUS ERIE — RUSTON — BUCYRUS

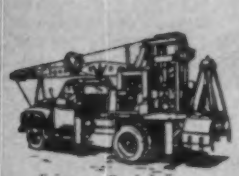
BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin, U.S.A.

and

RUSTON-BUCYRUS, LIMITED
Lincoln, England

●

World's Largest
Manufacturer of Excavators and Cranes



Hydrocranes

General Purpose Excavators

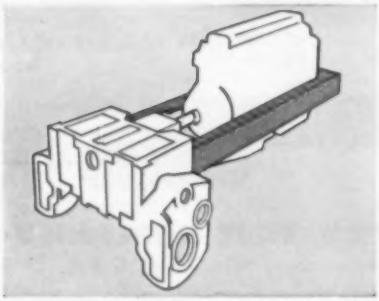
Railway Cranes

Blast Hole Drills

Walking Draglines

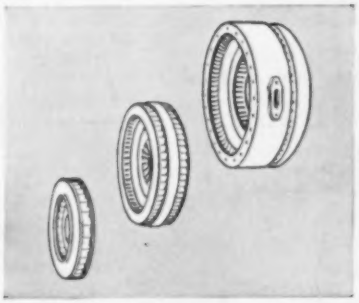
ALLIS-CHALMERS HD-21

Engineered to take the STRAIN, the SHOCK, and the GRIND of Modern Construction



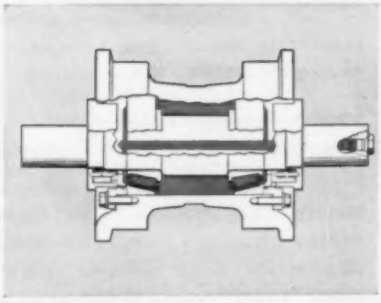
THE STRAIN

The Allis-Chalmers all-steel, Box-A Main Frame soaks up strains . . . does *not* use the engine as a structural member. It allows more efficient equipment mounting, provides excellent weight distribution and makes possible unit construction for unmatched servicing ease.



THE SHOCK

Sudden overloads are common in dozer operations. But hydraulic torque converter cushions shock, protects entire power train. This drive is standard equipment on the HD-21 and has been *proved* on Allis-Chalmers tractors since 1941.



THE GRIND

"Grinding compound" never reaches the truck wheel, support roller, idler and final drive bearings on an Allis-Chalmers tractor. Tapered roller bearings and *Positive* Seals keep dirt and moisture out and hold lubrication in for at least *1,000 hours* without lubricating attention.

HD-21
204 net engine hp
Approx. Weight (as illustrated)
51,845 lb

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

DIPPERS
For any stick connection.
DRAGLINES

ESCO

TAPERED DRAGLINE BUCKETS

LOAD FASTER DUMP CLEANER

Any way you look at an *ESCO* Tapered Dragline Bucket it's the taper that makes it better.

PATENTS PENDING

LOAD FASTER. Bucket sides flare outward from the lip to increase loading speed. Material is not compressed into the opening but allowed to expand and flow up and back along the tapered sides, filling the bucket completely without voids in the rear. Bucket fills in shorter drag distance—less line pull required.

DUMP CLEANER. Taper from front to rear and outward flare from lip to arch allows load to drop quickly and easily from the bucket. Load always dumps clear of high tubular arch.

LAST LONGER. Tapered design reduces loading and dumping friction to an absolute minimum. Bucket lasts longer. All welded construction and the maximum use of alloy steel castings make a high strength-to-weight ratio possible, resulting in "lower cost per yard operation".

ESCO Tapered Dragline Buckets have proved their ability to load faster, dump faster and cleaner by thousands of hours of operation in all kinds of digging. Currently available with lip widths from 52" to 96", 2½ to 15-yd. sizes. Ask your nearest *ESCO* dealer for details today, or write direct.

Manufacturing Plants
2143 N. W. 25th Ave., Portland 10, Ore.
1017 Griggs Street, Danville, Illinois

***ESCO* International**
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Other Offices and Warehouses:
Los Angeles,
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Seattle, Spokane, Washington
Houston, Texas
Eugene, Oregon
Salt Lake City, Utah
Denver, Colorado
Honolulu, Hawaii

In Canada, *ESCO* Limited
Manufacturing Plants
Vancouver, B. C., and
Toronto, Ontario

ESCO

ELECTRIC STEEL FOUNDRY CO.

DIPPERS

For any stick connection. General purpose, Heavy Duty, Coal Loader, Mesabi Type—to your specifications, your job requirements.

DRAGLINES

Featherweight, Medium Weight, Heavy Duty Standard, Heavy Duty Mining, for any excavating or loading job.

ORANGE PEELS

Full leaf, semi-leaf, and digging leaf, three point grip for fast, efficient handling of rip-rap, boulders, stumps, logs and scrap.

HOES

FASTBACK® design eliminates drag and heeling action in trenching and back filling jobs. Sixteen basic lip widths. Cutting widths from 20" to 62". Digs equally well with or without sidecutters.

NO DIGGING PROBLEM TOO TOUGH FOR BUCKET ESCO SPECIALISTS

CLAMSHELLS

For all-purpose digging and materials rehandling. Two through six part reeving permits wide range of closing power and speeds. Equipped with ESCO Two-Piece Teeth for faster handling of compacted materials.

Draglines, dippers, hoes, clams, orange peels – *ESCO* builds them *all* to handle your toughest digging requirements. Drawing upon years of design and fabrication experience, *ESCO* engineers can build a bucket for *your* job that will:

INCREASE YARDAGE: *ESCO* buckets are job-tailored . . . to solve your specific digging problems.

CUT COSTS: Critical wear points are alloy steel castings. High strength-weight ratios are achieved through all-welded construction. *ESCO* buckets are available with *ESCO* quick-change two-piece teeth. Seven different point shapes for faster digging.

See your nearest ESCO dealer or write direct

ELECTRIC STEEL FOUNDRY CO.

Manufacturing Plants
2143 N. W. 25th Ave., Portland 10, Ore.
1017 Griggs Street, Danville, Illinois

ESCO International New York Office
at 420 Lexington Ave., New York City, or Portland Manufacturing Plant

Other Offices and Warehouses:
Los Angeles,
San Francisco, California
Seattle, Spokane, Washington
Houston, Texas
Eugene, Oregon
Salt Lake City, Utah
Denver, Colorado
Honolulu, Hawaii

In Canada, ESCO Limited Manufacturing Plants
Vancouver, B. C., and
Toronto, Ontario

Digs More

A combination of powerful "pry-out" action using breakout pads as a fulcrum for leverage and a 40° bucket tip-back *at ground level* gets BIGGER LOADS with less spillage.

Carries More

Heaped loads are cradled closer and lower for greater stability while carrying. Exclusive load shock-absorber also cushions the load, smooths the ride, and permits faster movement with less spillage.

Delivers More

Since you get MORE to begin with and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result—you *deliver* more yards per load and more loads per hour.

One of the big reasons why the new all-wheel-drive "PAYLOADER" tractor-shovels can accomplish more *work* and can do more *jobs* is the BONUS tractive effort provided by their power-transfer differentials. This important feature — exclusive with "PAYLOADER" in the tractor-shovel industry — automatically transfers more power to the wheels on the firmest footing. You get traction and action instead of wheel-spinning inaction on sand, mud and snow.

These outstanding machines also have "no-stop" power-shift transmissions, torque-converters, planetary final drives, power-steering, 4-wheel power brakes. Your "PAYLOADER" Distributor is ready to show you *all* the superior features of these three new models. A demonstration will convince you that they are the finest, most productive units, size for size, in tractor-shovel history.

THE FRANK G. HOUGH CO.
708 Sunnyside Ave., Libertyville, Ill.

Send data on "PAYLOADER" Tractor-shovels

- ☐ 4 wheel drive types to 2½ cu. yd.
- ☐ rear wheel drive types to 1½ cu. yd.
- ☐ front wheel drive types to 1 cu. yd.

Name _____

Title _____

Company _____

Street _____

City _____ State _____

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY INTERNATIONAL HARVESTER COMPANY

the man at the controls doesn't wear kid gloves

he has a tough job to do and needs equipment that can take it!

HENDRIX

DRAGLINE BUCKETS

FILL FASTER

HANDLE EASIER

DUMP CLEANER

All Hendrix Buckets available without perforations

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

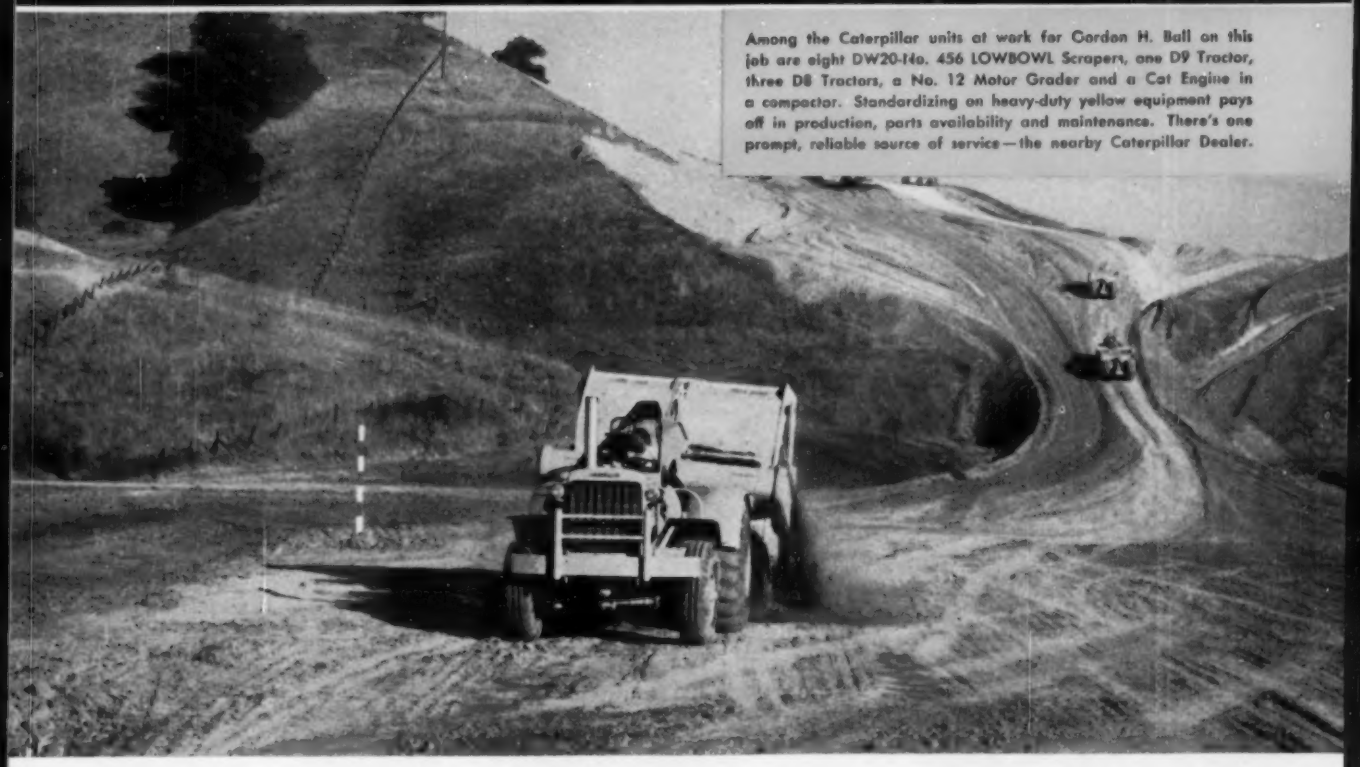
A TYPE FOR
EVERY DIGGING PURPOSE

¼ to 40 Cubic Yards

See you at the ROAD SHOW — CHICAGO
Jan. 28-Feb. 2, 1957

Hendrix Lightweight DRAGLINE BUCKETS

New CAT LOWBOWL Scrapers handle big production on California highway job*



Among the Caterpillar units at work for Gordon H. Ball on this job are eight DW20-No. 456 LOWBOWL Scrapers, one D9 Tractor, three D8 Tractors, a No. 12 Motor Grader and a Cat Engine in a compactor. Standardizing on heavy-duty yellow equipment pays off in production, parts availability and maintenance. There's one prompt, reliable source of service—the nearby Caterpillar Dealer.

Working on the construction of a 2.6-mile bypass near Lafayette, California, Gordon H. Ball has eight new four-wheel Cat DW20-No. 456 LOWBOWL Scrapers handling the job, estimated at 1,500,000 cu. yd. The material is sandstone clay. Mr. Ball, whose company has used Caterpillar equipment for 35 years, is more than satisfied with the production of the LOWBOWL units. They are moving about 10,000 cu. yd. in an eight-hour day.

On job after job, you hear similar reports about new Cat LOWBOWL Scrapers. When matched against competitive units under identical conditions, these rigs have delivered bigger, faster loads. Here's why: The No. 456's LOWBOWL design loads more material with less resistance clear to the end of the loading cycle for quicker heaped loads. And the DW20's new 300 HP (maximum output) Turbocharged 6-cylinder engine delivers 10% more rimpull and a top speed of 32.1. There's power aplenty for hauling heavy loads and for fast round trips, even against adverse grades. Another plus: New tubeless tires on scraper and drive wheels, available at no extra cost, eliminate an estimated 80% of down time caused by tires.

Besides the four-wheel DW20-No. 456, there's a two-wheel DW21-No. 470. Both LOWBOWL Scrapers are cable-operated and have a capacity of 25 cu. yd. heaped and 18 cu. yd. struck. Both are ruggedly built to move more earth faster at lower cost with less down time. For facts and figures about LOWBOWL superiority on actual jobs, see your Caterpillar Dealer. Name the date—he'll be glad to demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BIGGER, FASTER LOADS WITH CAT LOWBOWL SCRAPERS

Excavating Engineer
founded 1905 OCTOBER, 1956

Rocky Arizona terrain is shown here as two sets of dual Gardner-Denver drills work down a hillside. A powderman is close behind.

Pipeliners Dig Through 60% Rock

by Ray Day

Arizona's rocky malapai country is conquered again as pipeline crew strings new 34-in. line between New Mexico gas fields and California. Ditching job is tough on men and machines.

IN high mountain country around Flagstaff, Ariz., men and machines of Western Pipeline, Inc., Austin, Tex., are battling what pipeline men know is one of the West's worst rock formations: malapai. Approximately 60% of a 256-mile job for El Paso Natural Gas Co. falls into the "drill and shoot" category. The route follows a trail which other pipeliners have blazed before, but this job is no less difficult. Malapai is tough wherever you find it.

Western's contract calls for a 145-mile leg of 34-in. diameter steel pipe, extending from Topock, Ariz., at the California line to a point just east of Flagstaff. In addition, a 111-mile leg of 20-in. line goes south from Ashfork, Ariz., to deliver gas to Phoenix. The 34-in. pipe is part of a main transmission line which El Paso Natural Gas Co. currently has under construction between its gas-gathering facilities in the Farmington (N. M.) area and the California state line.

The section between Farmington and the east terminus of Western Pipeline's contract is to be constructed by El Paso Natural Gas Company's own forces and equipment. That work should have kicked off officially by the middle of the summer. The 34-in. line is some of the biggest pipe ever rolled. It takes big-diameter gas lines, however, to meet the growing demands on the gas industry because of population and industrial concentrations in the West. Purpose of this new line between Farmington and the Colorado River is to supply Pacific Gas and Electric Co. of San Francisco, Calif., with new gas supplies which have been created in the last year or two. PG&E has additional pipeline

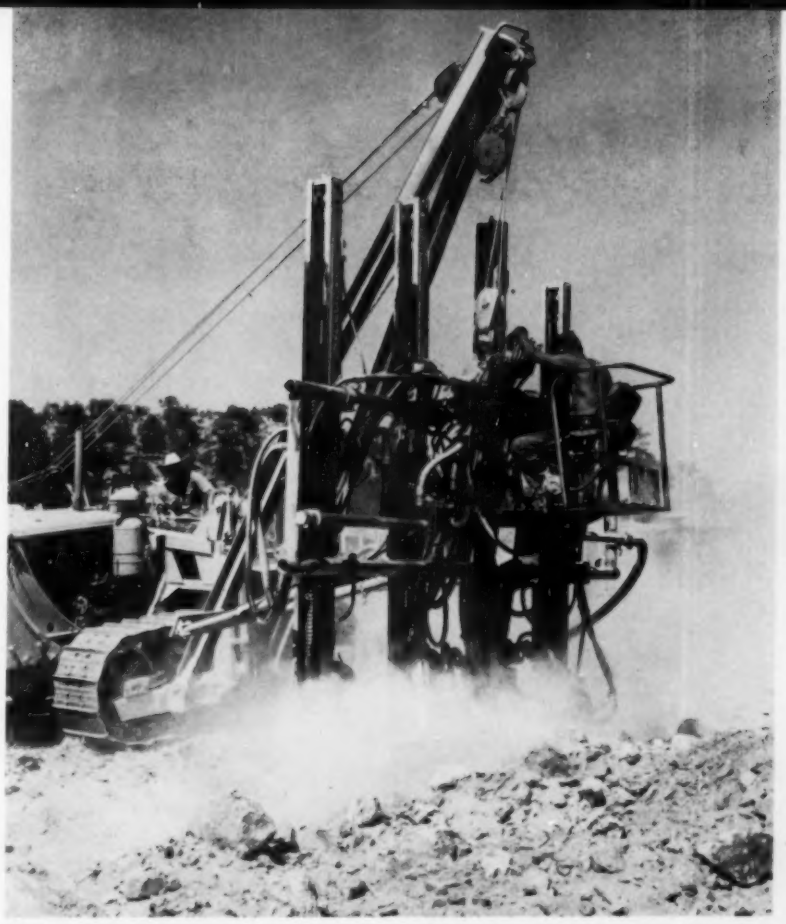
contracts under way on its own in California, which eventually will bring the newly delivered gas to the San Francisco Bay area.

There was some delay to Western's contract, as well as to work which El Paso Natural Gas is doing with its own forces, because of slow pipe deliveries during the spring of 1956. When pipe was finally delivered, strung, and welding was ready to start, Western had nearly 110 miles of ditch already prepared. In some respects this may have been a good thing, because of the general difficulty of constructing ditch in malapai country fast enough to stay ahead of other operations.

Pipeline Follows Contours

Specifications, which are being administered by Stone & Webster, agents for financial backers of the line, call for a minimum of 30-in. cover over the line at all points. Beyond that criterion, the pipeline simply follows the contour of the country through which it passes in as straight a line as possible.

Western Pipeline established its preliminary field headquarters at Flagstaff, and from that point controlled practically all the construction work. The camp setup includes a large circus-type tent which covers a heavy-equipment repair area. There is also a large office



This Gardner-Denver quad drill lets one operator do the work of four men. Two 600-cfm G-D rotary compressors furnish air for the drills mounted on a single carriage.

trailer for administrative purposes, and a large storage area for equipment, materials deliveries and supplies.

Right-of-way clearing and ditch excavation began at the east end near Flagstaff and proceeded west toward the western terminus of the project. With the exception of the extensive early start on ditch excavation, the project is following the usual organizational pattern for pipeline work. The pipeline right-of-way first is cleared for stringing trucks to deliver pipe, and ditching machines to open up the pipeline trench. After the pipeline is strung, and sometimes before, the ditch is excavated and the pipeline is laid out in place. Crews then move in to bend any pipe sections which require a curved alignment, after which crews and equipment assemble the pipe, do the necessary welding, clean and apply protective coating, lower the line in place, and backfill dirt or broken rock over the pipeline. Tie-ins, the construction of valve and other transfer stations, and eventually the construction of booster

A ¾-yd. dragshovel with tractor treads battles its way through malapai rock.

Material is thrown out at high speed from the discharge end of a Cleveland 320 ditcher. Subsoil is loosened by a ripping bar pulled down the center of the trench.

pumping stations will complete the job.

Because the line is located generally on right-of-way already occupied by an existing 30 and 24-in. transmission line, extensive clearing of trees was not required. It was necessary, however, to do rather extensive grading in places, and even to drill and shoot solid rock formations. The company assigned four Caterpillar D8 series E machines, with cable-controlled dozers and Ateco rear-end rippers, to the preparation of right-of-way. If wagon drill work was necessary to blow rock out of the right-of-way location, wagon drills and an occasional compressor were borrowed from the regular rock gang which did the drilling for the ditch. While right-of-way clearing and grading was tough in places, it proceeded at an average of over a mile a day.

Excavation of the pipeline trench through malapai country was easily the worst problem men and equipment faced. There were occasional long straight stretches, of course, where topsoil, volcanic cinders and loose sand and gravel were the only formations which stood in the way. In these places excavation was easy, and conventional ditching machines could make 1½ miles and more each day. There was intermediate digging, too, where the ground was too hard for straight digging by ditching machines, but hardly worthy of high explosives.

Ripper Loosens Soil

In these places, a powerful Caterpillar D9 tractor, pulling a 6-ft. single-tooth ripper, did an excellent job by sub-soiling the formation down to a point where the loosened material could be removed by ditching machines or dragshovels. Malapai, cemented boulders, granite and other hard rock, much of it in a solid or semi-solid state, are found in over 60% of the ditch. The only way to make pipeline ditch through this material was to blast the rock out by high explosives and then bail out the pieces with dragshovels.

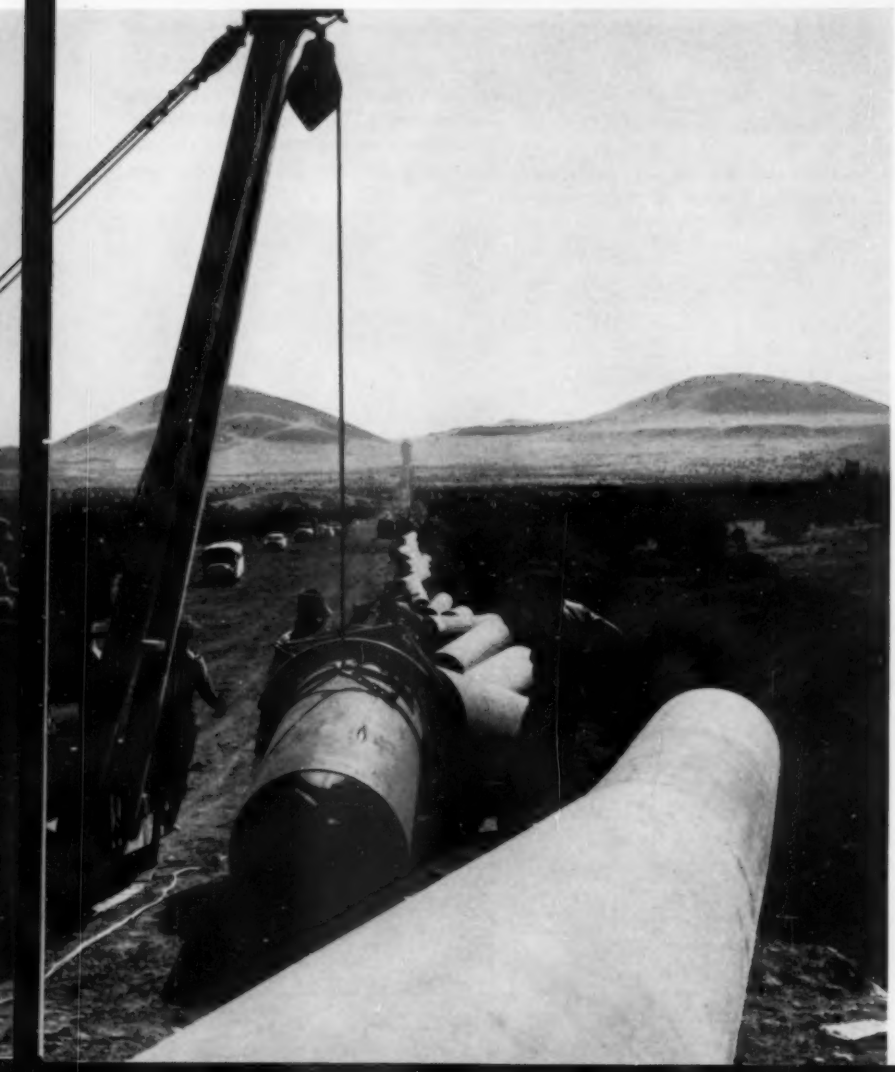
Western Pipeline has found an efficient way to handle the removal of malapai. It has brought in four Gardner-Denver quad drills, each unit containing four Gardner-Denver wagon drills which are operated from a drill carriage by one operator. There are also two sets of Gardner-Denver twin drills with the same type mounting. There is a Gardner-Denver 600-cfm rotary air compressor available for each battery of two drills. One 600-cfm air compressor is needed for a twin unit; two 600-cfm compressors are required for one of the quad drills.

Drilling is done as a close-coupled operation, hitched tightly to ditch excavation. This is necessary because there are miles of ditch location where one or two feet of topsoil overlies the solid rock formation. This material must first be removed before the wagon drills move in. Removal of this material is being done either by one of two conventional trenching machines, or by dragshovels assigned to the project.

Following the removal of overburden, an interesting and highly successful method of drilling malapai with small-

diameter holes is used. The quad drills are mounted on their carriages four feet apart, and the carriage hangs from the end of a pipelayer boom on a Caterpillar D7 or D8 tractor. With the quad drills, a row of four holes is punched in to a point about one foot below grade at or slightly back of the projected sideline of the pipe trench. When the row of holes is drilled on the opposite side of the trench, also using the same centers, the drill bits are staggered so that the hole centers are two feet wide on alternate sides of the trench. These holes are being bottomed at 1¾-in. diameter, using tungsten-carbide drill bits. Most of the rock is solid, but in a few places the malapai also tends to ravel. Here it is necessary to add water, during the drilling, to prevent coarse particles from caving in and sticking the bits.

An interesting blasting method also has been devised, which is old rather than new, but which is working very well. It consists of loading the holes with an average of one stick of 1⅛-in. diameter Du Pont Red Cross 40% powder of extra strength per linear foot of hole. At least 15 inches, and preferably 18 inches, of stemming is tamped in over the top of each charge. The electric detonation system has been discarded here in favor of a return to old-time blasting caps fired by 7-ft. lengths of fuse cut to as exact a length as possible. Powdermen on this project prefer to use fuses with a burning time of five minutes. That gives them ample time to light the pigtailed ends, moving on down the line as the first holes explode.



(Above) Pipe sections are joined by a welder who applies Fleetweld 5 rod. (Below) A field-beveled cut is made with the help of an H&M pipe beveling machine.

Ignite Fuses

Up to two miles of loaded ditch have been shot at one time, as the powdermen and three helpers move down each side of the ditch and light the ends of each fuse in alternate order. Powdermen don't stop when they light fuses; there's plenty of time for them to be a safe distance ahead when the powder charges begin to explode alternately on each side of the trench behind them. The effect of this type loading and shooting causes a peculiar diagonal throw of the powder's energy in an X-type pattern, which has resulted in excellent breakage of even the worst malapai. And make no mistake about some of it being bad—it is fissured, pockmarked with blow holes, and has cavities and clay seams. But the effective drilling and loading method has solved what

The dope crew starts to apply enamel and paper wrapping. CRC lowering-in rig (right) is suspended by a Cat No. 583 pipelayer.

has been an extremely tough problem on all pipeline and highway contracts through this area.

A sizable army of dragshovel equipment has been brought in to muck out the broken rock from the ditch lines. Heading the list are four Bucyrus-Erie 22-B's, six Northwest Model 25's, and a small Link-Belt Speeder machine. These machines are being used with ¾-yd. dippers, equipped with H&L detachable points on their dipper teeth. Some Esco rock points also are being used.

All of the dragshovels on this project are getting a severe workout. The terrain is so rough in many places that hold-back Cats are used to assist the dragshovels on mountainsides. In other places, fragmentary breakage of malapai and other rock formations has caused the machines much hard work to remove big pieces from the ditch site. If the need for secondary shooting is obvious, the drilling crew does it without fail, but in many places a small tight spot can be excavated with a little extra punishment to the shovel. All of these factors add up to a tough job.

Some of the most spectacular ditch excavation is being done by a Cleveland 320 ditching machine and a CRC "Pipeline Special," with the help of a heavy 6-ft. sub-soiling or ripping bar pulled down the center of the ditch line by a Caterpillar D9 tractor. The power of the D9 has been ample to rip up large boulders, soft tertiary-type rock and even some solidly bedded sandstone. Following the passage of that equipment, the crawler-mounted ditching machines excavate at high speed, making approximately 1½ miles per day for both machines. Performance of the dragshovels for a 10-hour shift ranges from 500 feet in tough, rocky going to about 1,100 feet in easier digging.

Pipe Strung by Specialists

The big 40-ft. joints of steel pipe, whose standard .406-in. wall sections weigh 7,000 pounds each, are being rolled in Orange, Tex., at a steel fabricating mill. Shipped by railroad to the nearest point along the line, the heavy sections are being strung by a specialist firm which has established a great name for itself in that line of work: Dunn Bros. of Dallas, Tex. The stringing company is using a fleet of International L-190's to haul the pipe from railroad sidings. Parts of the line are even heavier than 7,000 pounds per section because of thickened walls of .500-in. diameter. These sections are to be used under all railroad crossings, and through the city of Flagstaff. As the joints are strung out on their location, a survey crew moves through and designates certain sections to be bent to fit the contour of the rugged mountainous country through which the line passes. There is one point in Flagstaff, for example,

where a 44½° bend was necessary, according to Spread Superintendent R. L. McMillon. To do the bending, a Caterpillar D8 with a pipelayer boom and a CRC cable-controlled bending machine are being used.

Pipeline excavation had been under way from March 15 until June 5 before work began on assembling and lowering in the pipeline. Nevertheless, when operations did commence, they jumped off to a fast start and have continued at that pace, so that by December, 1956 all 256 miles will be in and finished.

The sections of pipe are being strung together by a Caterpillar MD7 pipelayer, which hangs onto each piece just long enough to give welders a chance to tie the joints together. First welds on each joint are known as stringer beads, and are being placed by a truck-mounted battery of four 300-amp Lincoln welders, using Fleetweld No. 5 welding rod. The next system of welds, known as the hot pass, is being put on by six Lincoln 250's mounted two and four to a truckbed. The hot pass weld is being made with Shield Arc 85 rod in $\frac{5}{32}$-in. size. Four Lincon 250's apply the hot-pass weld, which fills the V-groove still further. With the exception of those pipe sections which have to be cut in the field, all pipe arriving at the job has standard beveled ends to facilitate easy welding. These ends are buffed just prior to assembling by a small LeRoi Tractair 125-cfm machine and an air-operated steel buffer. Electric buffers are used also during the welding process to remove slag.

The Western Pipeline spread is run by Superintendent R. L. McMillon (left), who is engaged in animated conversation with his dope gang foreman, Rip Vann.

Final welding consists of filler and cap beads which are being placed by 20 welders using Lincoln 200's. Shield Arc 85 welding rod is used here, too. Rod of $\frac{5}{32}$-in. diameter makes the filler bead, while $\frac{3}{16}$-in. rod is used on the cap. During the welding operation, the pipe rests on cribs, made with 4 x 6 and 6 x 6 timbers. These cribs are spaced about 40 feet apart. After the welders have finished, the pipeline is tight and strong enough to hold the surging power of compressed gas moving at 30 mph through the line and exerting a pressure of 900 psi against the sidewalls.

To make sure that all welds are solid and tight, frequent X-ray checks are made, chiefly to verify average procedure and to check on the work of individual welders. If any bad welds are found, they are cut out and replaced.

Among machines which were busy on trench excavation was this ¾-yd. rig.

One of the fastest moving crews on the Flagstaff spread is the dope gang which cleans the pipe and wraps it with permanent protective coating before the pipe is lowered into the trench. Equipment in the dope gang string includes a Cat No. 583 pipelayer with a CRC cleaning machine, which removes all rust and scale from the pipe. Then comes an International TD-24 with a Superior sideboom cradling the line and towing a CRC enamel kettle. Next machine in the line is a Cat 583 pipelayer with a CRC wrapping machine powered by an International U-164 diesel engine. Function of this machine is to apply hot Pittsburgh enamel, two wraps of kraft paper and one wrap of glass-fiber paper. The 583 pipelayer with the CRC lowering-in machine then follows.

Between the lowering-in and wrapping machines, a spark-detector crew works to make sure that an electrically-tight wrapping has been applied. One of the worst enemies of steel pipelines is electrolysis from ground currents, which eats the metal of a pipeline away at high

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They Dig to Build Flat Roads

Contractor Henry L. Stafford's men dig 87,000 yards of caliche for sub-base use.

by Floyd Suter Bixby

Here's an overall view of the Pecos pit, with a 1½-yd. 38-B loading caliche to a Ford truck. The crushing plant is in the background. Caliche breaks down easily.

ONE warm, sunny day last March, two service mechanics drove south from the Pecos on Texas Route 17 looking for a 1½-yd. Bucyrus-Erie 38-B shovel. Owned by contractor Henry L. Stafford of Lubbock, the machine was supposed to be working somewhere in that territory on a highway project. Stretching out ahead as far as the eye could see was a perfectly flat expanse of west Texas cotton land. The highway was level and straight.

"Where in the world do you suppose Henry Stafford could hide a 38-B in country like this?" asked one of the mechanics. "A man ought to be able to see a machine that big for a hundred miles in this country."

What this man may not have realized fully was that Stafford's 38-B was doing a unique excavating job. Stafford's contract called for construction of 19 miles of Route 17 from a point 13 miles south of Pecos to U. S. 290, near the town of Balmorhea. Although the construction job was flat with very little grading, Stafford's 38-B was a key machine affecting the progress of the entire job. Its assignment was to dig some 87,000 yards of caliche from one pit location to produce a flexible sub-base for the new highway. Until this was finished, paving could not be done.

The caliche sub-base is a west Texas fixture, one in which some contractors excel. Over the last several years, Henry

H. L. Stafford's contract called for construction of 19 miles of U. S. Route 17. This 1½-yd. shovel digs caliche for sub-base use.

L. Stafford's organization has created an enviable reputation in the construction of such bases.

West Texas is a semi-arid country where winter snows and summer rains are scarce. The land is flat for miles. Some of the topsoil is sufficiently rich so that vast acreages of cotton and alfalfa can be grown. Underlying the entire area is a thick subsoil layer of a calcareous lime formation called by its generic name of "caliche." It sometimes outcrops to ground surface. It makes excellent highway sub-base, principally because: 1, it breaks down rather easily under rock crushing and, 2, when put together properly in a sub-base course with the right amount of water, a high degree of cementation takes place.

Excellent Sub-base Material

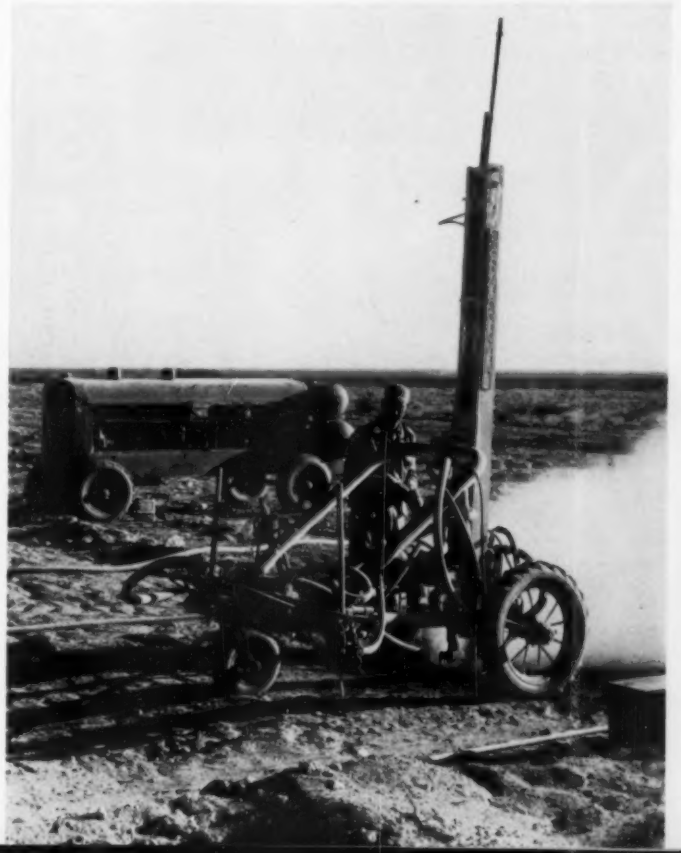
A caliche sub-base can be rolled with additional surface moisture to create a kind of smooth slurry, so that amazing riding qualities are developed. This "slush rolling," combined with the tight-blading skill of an experienced motor grader operator, is responsible for many of the velvet-smooth asphalt highways in west Texas.

This was the engineering behind Stafford's $319,196.60 reconstruction contract on Route 17. The old road had been constructed two decades ago, largely on permanent alignment. Increasingly heavy traffic had made reconstruction of the southerly 19 miles advisable. The new roadbed is 42 feet wide, giving room for a 24-ft. plant-mixed asphalt concrete surface, 7-ft. asphalt-penetration shoulders on either side and two feet of exposed subgrade as a safety factor.

Roadbed grading was a light almost minor operation. Because the highway was largely on permanent alignment and passed through flat country, the old asphalt surface and a narrow lift of old sub-base course were ripped up. These materials were incorporated with borrow dirt brought in from a ditch on either side of the highway. It was a job in which tractor equipment excelled. Stafford brought in three Caterpillar DW15 hauling units and three teams of D8 tractors with Cat scrapers.

As these machines dug the necessary earth and brought it in for the roadbed, four 4,000-gal. water tanks mounted on GMC, Ford and Chevrolet trucks hauled necessary moisture from nearby irrigation canals. Two sets of Gebhard sheepsfoot rollers, pulled by a Cat tractor, worked with two sets of Tampo pneumatic rollers in compacting the earth subgrade to high density. Final shaping was done to a tolerance of ¼ inch in 10 feet by one of several Cat No. 12 motor graders assigned to the job. This grading work went on progressively from both ends of the proj-

Powered by air supplied by Schramm compressor, wagon drill sinks blast hole.



ect. All borrow ditches were left gently sloped.

According to veteran construction supervisors on the Pecos job, one of the tricks to a smooth final highway is to do a smooth job on the earthwork. If this is done, blending and laying of caliche sub-base is made easier. It naturally follows that a smooth sub-base job makes the work of an asphalt paver easier. Stafford's crews are using this approach to the work at Pecos to develop a strong, smooth highway.

One Pit Location

The entire 87,000-yd. sub-base item was being produced from one pit location, centered almost exactly in the middle of the project. Men who worked for the trucking subcontractor had a term for these distances, since they hauled in a pay arrangement based on transporting a cubic yard of material a quarter of a mile. The pit location was "36 quarters" from one end of the project and "41 quarters" from the other. Fortunately, the pit was located practically alongside the highway, where the caliche deposit emerged near the surface of the ground.

The formation was a typically firm-bedded lime caliche terminating in the bottom reaches with very hard limestone. It was much too firm and hard to be dug directly with a power shovel, so some loosening with high explosives was necessary. The formation was being drilled ahead of the 38-B by a Gardner-Denver wagon drill using Timken 3-in. rock bits. Air was furnished by a portable Schramm 315-cfm compressor.

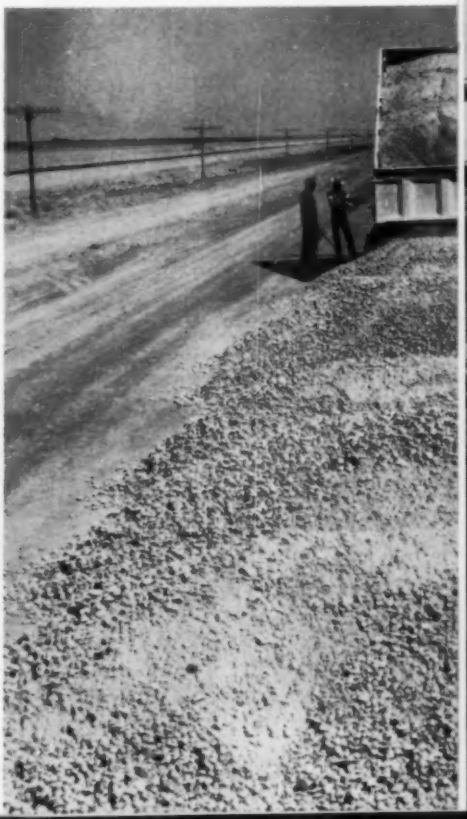
A ditch along either side of the existing highway provided earth for the roadbed. It was excavated by three Cat DW15 units (above) and three Cat D8 tractor-scrapers.

The hole pattern for a 13-ft. deep bank was on a 20-ft. square grid spacing, with spacing shortened up commensurately if a bank less than 13 feet was dug. Wherever possible, Stafford's men preferred to handle a bank not greater than 11 feet high. That put the shovel operator clear of the bank. Because of high winds typical in this part of west Texas, a windy day makes it difficult for an operator to see what he is doing if the bank ahead of the shovel is more than 11 or 12 feet high.

The ground ahead of the shovel was loosened by springing each hole with three pounds of gelatin-type Hercules powder and then loading Hercomite bag powder to within approximately six feet of ground surface. Instantaneous electric blasting caps, set off by a DuPont blasting machine, exploded the powder. Small, rather than large, shots usually were set off. Shots averaged from six to ten holes.

Progress of the rest of the job hinged on excavation and loading in the pit. It was the function of the pit shovel

Carefully dumped as to volume, loads of caliche like this form the sub-base.



This typical west Texas compaction photo shows a Tampo pneumatic roller being pulled by a Farmall M tractor as it rolls down highway tightening base material.

to turn out enough material to keep a 300-yd. per-hour rock plant supplied. The 38-B which Stafford uses for that work was purchased in June 1954. Powered by a Caterpillar diesel engine, it uses a Bucyrus-Erie 1½-yd. dipper with H&L tooth points.

Hauling units around the 38-B included three 8-yd. Ford F-800's, which were spotted on a "drive-by" system. The haul road they used circles parallel to the bank so that a maximum 90 degree swing will handle any cycle. When the truck is loaded, it can drive away immediately without backing or maneuvering.

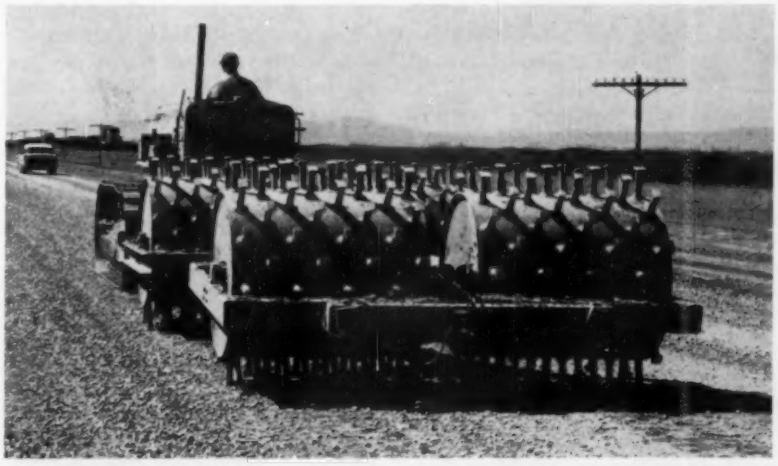
Although the exploded caliche had been fairly well loosened at this stage, its digging nevertheless was somewhat difficult. The pit south of Pecos has a factor of abrasion considerably higher than is usually encountered. Instead of lasting a week, shovel teeth must be replaced about every 15 hours.

Broderick & Bascom wire rope was being used on the 38-B's control lines. Fuel was supplied by a mobile lubrication truck which visited the job each day at noon. The 38-B was working an 11-hour day, during which time it turned out approximately 3,300 cubic yards. In softer caliche where the digging was easier, Pit Foreman J. L. (Shorty) Seabourn had moved 4,200 cubic yards in 10 hours with the 38-B. Sometimes Seabourn acts as the shovel operator.

"I don't know whether I am still a good enough man to do 4,200 yards in a shift," Seabourn explained, "because you realize conditions have to be perfect to do that. The material was piling up in the dipper, so that instead of handling 1½ cubic yards I was getting more nearly 2½ cubic yards each swing. And there was absolutely no resting between cycles. We had plenty of trucks."

A feature of the 38-B which has worked out well for Stafford is the machine's ability to move on a lowboy trailer intact between jobs. The Texas Highway Dept. allows gross loads up to 50 tons. The 38-B falls almost exactly within this limit, Seabourn said. The machine has been able to keep up with the output of the Cedarapids crushing and screening equipment which the company uses. The haul to the crushing-screening plant is short.

Stafford's standardized Cedarapids crushing and screening plant is capable of producing approximately 300 cubic yards per hour. It is a two-unit plant consisting of a primary jaw crusher unit



(Above) Part of the compaction is put into the sub-base by two double sheepsfoot roller units, pulled by a Cat tractor. (Below) A Cat grader shapes precise edge.

Much-needed water for the job was readily available from irrigation ditches. This GMC truck carries a 4,000-gallon unit.

connected to a standard Cedarapids Master Tandem rock plant, which finishes the pulverizing and gradation process.

Rock from the dump trucks passing through this plant is dumped first into a 36-in. apron-type feeder, electric powered, which transports the caliche to a 25 x 40 primary jaw crusher driven by a Caterpillar D13000 diesel unit. The jaw crusher is set to break down the caliche beyond four inches in size, after which it passes by an electrically-driven 30-in. stacker conveyor to the Cedarapids Master Tandem plant.

4x12-ft. Vibrating Screen

Passing through this plant, the material goes through a double-deck 4x 12-ft. vibrating screen which drops acceptable material immediately to a 36-in. stacker conveyor. This feeds a 21-yd. surge-storage bin. The remaining material retained on the screen decks passes through a 10 x 36 jaw crusher or a set of 40x22 rolls, both units being driven by a Caterpillar D17000 diesel. Both the 10 x 36 jaw and the roll crusher are arranged in closed circuit with the screen decks, so that material not quite meeting specifications will be rerouted through these units until it does. When the material meets specifications, it passes through the screen deck system and out the 36-in. stacker belt.

A fleet of 17 Ford F-600 trucks, pulling Hobbs Schonrock cable-controlled trailers, was working under a hauling sub-contract with A. C. McMillian of Fort Worth to transport the sub-base material to the highway. With 21 yards of surge capacity, these units had to move fast and keep well spaced. The ideal situation which truckers tried to maintain most of the time was to have one or two extra units waiting to load at the surge hopper.

The rock production and screening plant is sufficiently mobile so that the crew can tear it down and set it up again quickly. In moving the plant, the 38-B shovel is used to handle the feeder hopper, both stacker conveyors,

Construction of the few bridges on Stafford's contract was awarded to a small local outfit which specializes in that type of work. Photo shows bridge work in progress.

the surge bin and the D17000 diesel engine. On long moves the Caterpillar D13000 also is removed from the primary unit.

The plant crew consists only of four men working under the supervision of the plant foreman. These stations include a feeder man, one man tending the surge hopper, a plant oiler and a roustabout or cleanup boy. His job is to clean away the small spilled piles of material which cone up under idlers.

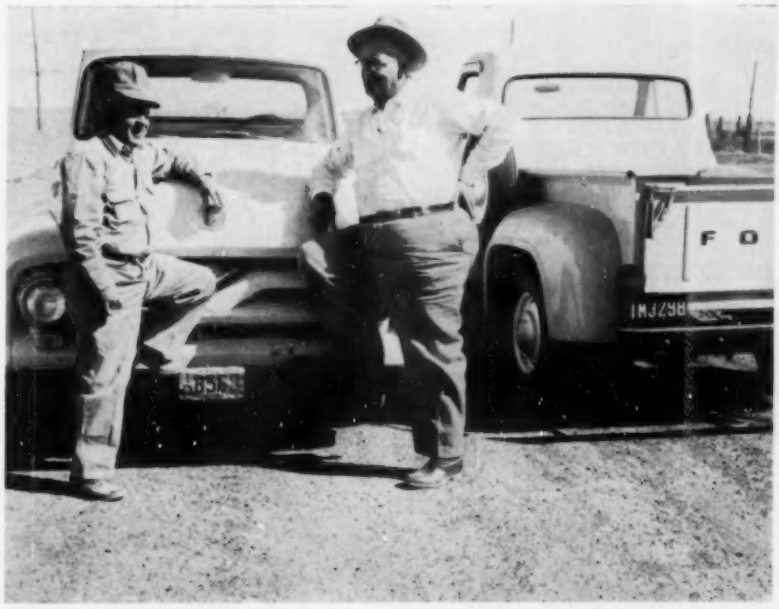
Placing Mile Per Day

When this was written, the Stafford organization was placing approximately a mile of caliche base per day, full width, over the roadway. H. A. Greenwood, the grade foreman, liked to work sections from 4,500 feet to a mile long, because this allowed the equipment to be strung out in orderly fashion. The steps which this veteran subbase builder uses in putting up a caliche base are:

1. With the subgrade bladed smooth as to elevation, the theoretical quantity per station of caliche base material is laid down on the basis of a shrinkage factor of approximately 25% after the material is compacted. On this project, where reclaimed base-course material was possible in the roadbed, only 5½ inches of new base material was laid. For the last 2½ miles, however, on the southerly end where no reclaimed base could be obtained because of the new alignment, two 3½-in. compacted layers of new material were being installed. In each of these cases, the theoretical quantity to be dumped was figured and the loads were placed by a grade spotter according to accurate taped measurements. One dump was made for the 5½-in. course; two dumps each for the 3½-in. courses.

Re-blending Necessary

2. Because of some unavoidable segregation of particles in hauling the materials, it is necessary to re-blend the crushed caliche again with motor graders. This is done by knocking down the dumped piles, forming it into a windrow and then rolling the windrow with motor grader blades from one side of the road to the other and back again. During this process, mixing water is hauled in continuously by five 4,000-gal. truck-mounted tanks. They haul from standpipes supplied by Rex centrifugal pumps. On a typical day when the caliche is sufficiently dry to require 10 gallons per cubic yard, almost a third of a million gallons of water will be handled by these five units. A good caliche base can not be laid until exactly the right amount of moisture has been distributed and particles well blended throughout the windrow.



J. L. Seabourn (left), pit foreman, and H. A. Greenwood, road foreman, exchange a few notes on the Route 17 project as they stop to talk out on the highway.

3. Beginning from the bottom of the windrow, the motor graders then begin to cut out the material in thin lifts, laying it over the roadway. While they work, two Farmall Model M tractor-drawn Tampo pneumatic rollers, heavily ballasted, roll up and down the spread material to put in the necessary compaction. A Tampo bullwheel-type roller also is being used. When the base course is nearly ready to top out, a double set of sheepsfoot rollers pulled behind a Caterpillar tractor makes approximately four passes.

The final rolling consists of heavy surface watering to build up a slurry and soften somewhat the first 1½ inches of the base surface. The purpose of this softening is twofold: 1, it helps to create a cement-like slurry of the fine particles in the mix, and, 2, it softens the top of the sub-base so that rollers can press the remaining large rock down into the body of the sub-base. The idea is to get these bigger particles embedded deeply and to leave a perfectly smooth cement-like top after the final rolling and blading. This is done by putting on plenty of water, applying repeated passes of the Tampo rollers and "tightblading" with motor grader blades. The final dressing by motor grader blades is designed to top out exactly at survey points. These are set every 50 feet along both sides and in the center line.

The final surfacing on U. S. 17 was to consist of 24 feet of asphalt hot-mix applied at the rate of 100 pounds per square yard, which will be approximately 1-in. thick compacted. This hot-mix was to come from a commercial plant owned by F. M. Reeves & Son. It is located about five miles from one end of the project. Since it is important to protect a caliche base from rainwater after it is installed, the 7-ft. shoulders on either side of the highway were to be waterproofed with a single asphalt penetration treatment, made by applying a heavy coat of asphalt and then rolling crushed rock into this material. All farm road turnouts also were to be shot completely to the right-of-way lines to create a finished, neat project.

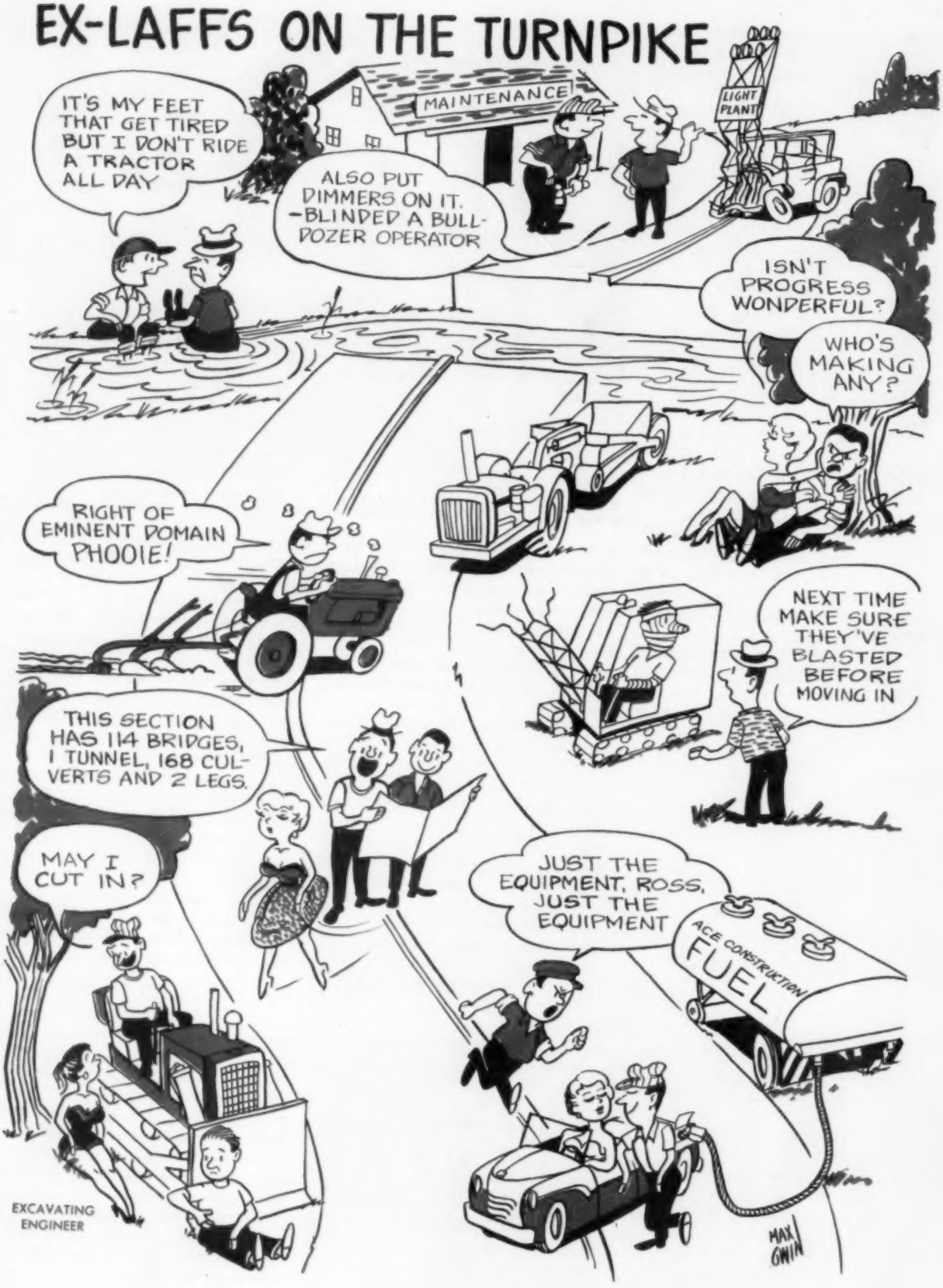
Neat, Orderly Operation

All told, it was a neat, orderly, well-planned roadbuilding operation. Stafford's crews expected to complete the 19-mile job in slightly less than six months' working time.

The project was being administered through District 6 of the Texas State Highway Dept., with R. L. Faltinson as district engineer, assisted by Gene Kelly as resident engineer.

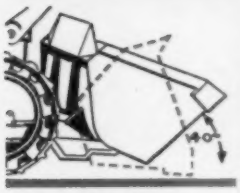
The contractor's supervision was under the personal direction of Henry L. Stafford, owner, with A. C. Melton as general superintendent.

EX-LAFFS ON THE TURNPIKE


IT'S MY FEET THAT GET TIRED BUT I DON'T RIDE A TRACTOR ALL DAY
MAINTENANCE
LIGHT PLANT
ALSO PUT DIMMERS ON IT. -BLINDED A BULL-DOZER OPERATOR
ISN'T PROGRESS WONDERFUL?
WHO'S MAKING ANY?
RIGHT OF EMINENT DOMAIN PHOOIE!
NEXT TIME MAKE SURE THEY'VE BLASTED BEFORE MOVING IN
THIS SECTION HAS 114 BRIDGES, 1 TUNNEL, 168 CUL-VERTS AND 2 LEGS.
MAY I CUT IN?
JUST THE EQUIPMENT, ROSS, JUST THE EQUIPMENT
ACE CONSTRUCTION
FUEL
EXCAVATING ENGINEER
MAX GWIN

SO FAST...YOU'D THINK IT WAS ON WHEELS...

the all new Rear-engine 1¾ yd. International® Payloader®

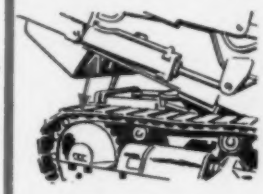


NEW PRY-OUT FORCE
International-built 77 net hp diesel engine, short-coupled power train, positive hydraulic action and 40° tip-back bucket on ground break-out pads combine to give tremendous pry-out force.

	1st	2nd	3rd
Forward	0-1.6	0-4.5	0-10.1
Reverse	0-2.1	0-5.7	0-13.1

NEW HIGH SPEEDS
The Payloader's top speed of 10 mph forward is nearly three times faster than most other competitive units. Top reverse speed of 13 mph is four times faster.

NEW VISIBILITY
Operator is always "on top of his work" because of rear-engine design. He works faster with less effort. To shift or steer, he pulls a hydraulic lever. There is no master clutch or steering pedals.



NEW SERVICIBILITY
Only tractor-shovel with tilting body, the Payloader permits mechanic to get at all four sides of engine easily and quickly. Tilting body for servicing takes only a few minutes.

Here's the new tractor-shovel that surpasses all competitive models for speed...gives you fastest loading cycles ...yet offers you crawler traction and stability for greater production and more profitable work in any terrain...in any weather. It's the all new, rear-engine, 1¾-yard International Model 12 Payloader...with new, high speeds, unmatched in crawler history...with new pry-out force necessary in rock and other tough materials...with new visibility, a result of rear-engine design...and new serviceability obtained by tilting the body to reveal engine and other components. See all these and many other International Payloader features at your International Construction Equipment Distributor, soon. Then try it! It's so fast...you'll think it's on wheels.

INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Company

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks.

Here's the operator's view as the 14-yd. bucket of the 480-W brings up overburden. Shovel in background is loading coal.

Kentucky Coal Firm Has a Bright Future

A fast-growing, progressive-minded young coal company, started by a couple of hard-working brothers, is nestled in the picturesque rolling hills of northwestern Kentucky. The Riverview Coal Co., Inc., of Hartford, Ky., owns the 2,000-acre Riverview mine. The brothers are Kermit (Jim) Hurst, company president and mine superintendent, and Hilary, who is secretary-treasurer.

The brothers, both soft-spoken and slightly graying men, settled back in their office chairs and began outlining their mining operation.

Hilary explained that from a modest beginning in 1950 the company had expanded rapidly. Approximately 1,900 tons of bituminous coal are now mined each day from the pit located 1½ miles west of McHenry and about 30 miles southeast of Owensboro, the only city of appreciable size in the area. Hilary and Jim agreed on an estimate that coal beds on the property would see the company through another 10 or 12 years, at least.

Company officials recently added a new Bucyrus-Erie 480-W walking dragline to step up the pace of removing

Brothers Kermit (Jim) and Hilary Hurst founded Riverview Coal Co. in 1950. Mine near McHenry produces 1,900 tons of bituminous coal per day. Firm foresees steady growth for 10 years.

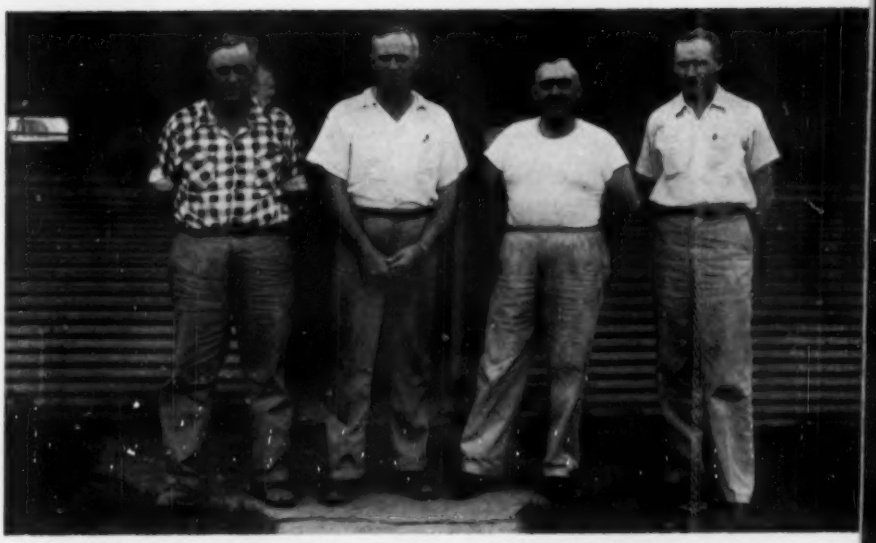
overburden. Consequently, the loading out of coal has been accelerated.

The 480-W is a 14-yd. machine with a 160-ft. boom. A 1,000-hp Cooper-Bessemer JS-8, 8-cylinder, 4-cycle diesel engine powers the 480-W. According to Jim Hurst, the 1½ million-pound dragline digs and casts about 17,000 yards of overburden in a 24-hour working day. About twice as much spoil is now being moved as had been previously by a 7-yd. excavator.

Climb Pit Rim

We left the Hurst office and climbed into Hilary's car for a visit to the pit. The car took quite a beating as it bounced over some rough access roads enroute to the working area in the mine. Hilary explained that we could have had a smoother ride by following the haul roads used by the coal haulers, but this would have taken us into the coal loading pit itself. It was necessary to take the rough road to get to the top of the ledge where the 480-W was working.

Since opening this location in 1953, the company has removed about 6 million yards of overburden to reach the rich bituminous coal deposits. The overburden, typical of western Kentucky, is clay, sandstone and shale. It reaches a depth of 60 feet. Present overburden consists of an average of 10 feet of hard clay with about 50 feet of a mixture of sandstone and shale under the clay.



Riverview officials are (from left): President Kermit (Jim) Hurst, Secretary-Treasurer Hilary Hurst, Vice President Nolan Ranney and Bookkeeper Morris Kell.

Below the overburden are two seams of coal. The upper layer is a 3-ft. seam and the lower one 2-ft. Between the two layers is a 1½ to 3-ft. layer of parting which consists of a mixture of coal, shale, and fireclay. The coal has a B.T.U. (British Thermal Unit) content of 14,200, ash and moisture free, and is of average bituminous hardness.

Mining starts when a Caterpillar D9 dozer clears the way for the dragline. The dozer builds a level road over the overburden for the dragline as it clears trees and strikes off a smooth surface with its blade. A McCarthy 103 drill, powered by a Ford gasoline engine, bores 6½-in. horizontal blast holes into the side of the overburden. Only horizontal holes are sunk.

An average of five holes is put in on each shift. They are spaced 24 feet apart and are drilled into the overburden to a length of 78 feet. Coal Master 77-A-2 augers and drill heads are used. Worn drill bits are usually thrown away.

Anywhere from 15 to 100 holes are shot at a time, between shifts, every two to four weeks. An average of 400 pounds of Du Pont E. L. 401 is used in each hole, which means that from 6,000 to 40,000 pounds of explosives go off in each blast. Ensign-Bickford Primacord with No. 17 Primacord delays is used to set it off.

So far, according to Mine Superintendent Jim Hurst, fragmentation has been good to very good, and little secondary blasting has been necessary. The secondary blasting has also been reduced by the walking dragline which can frequently balance big chunks of rock on its bucket and spoil them. Generally, a pound of powder takes care of 7 cubic yards of overburden.

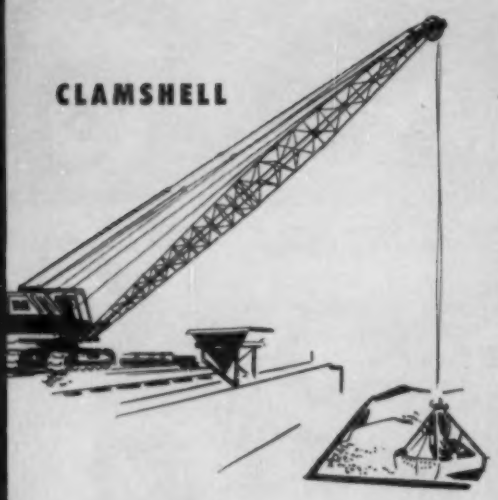
After the blast, the Cat D9 moves in and cleans and levels any large rocks or material which might impede the drag-

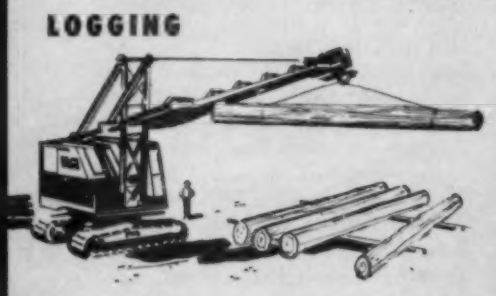
Continued on page 56

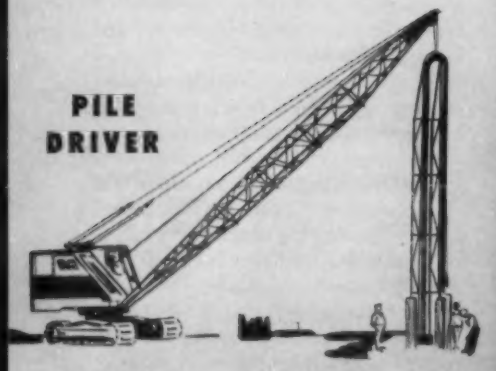
A load of overburden is deposited on the spoil pile by the 750-ton 480-W dragline.

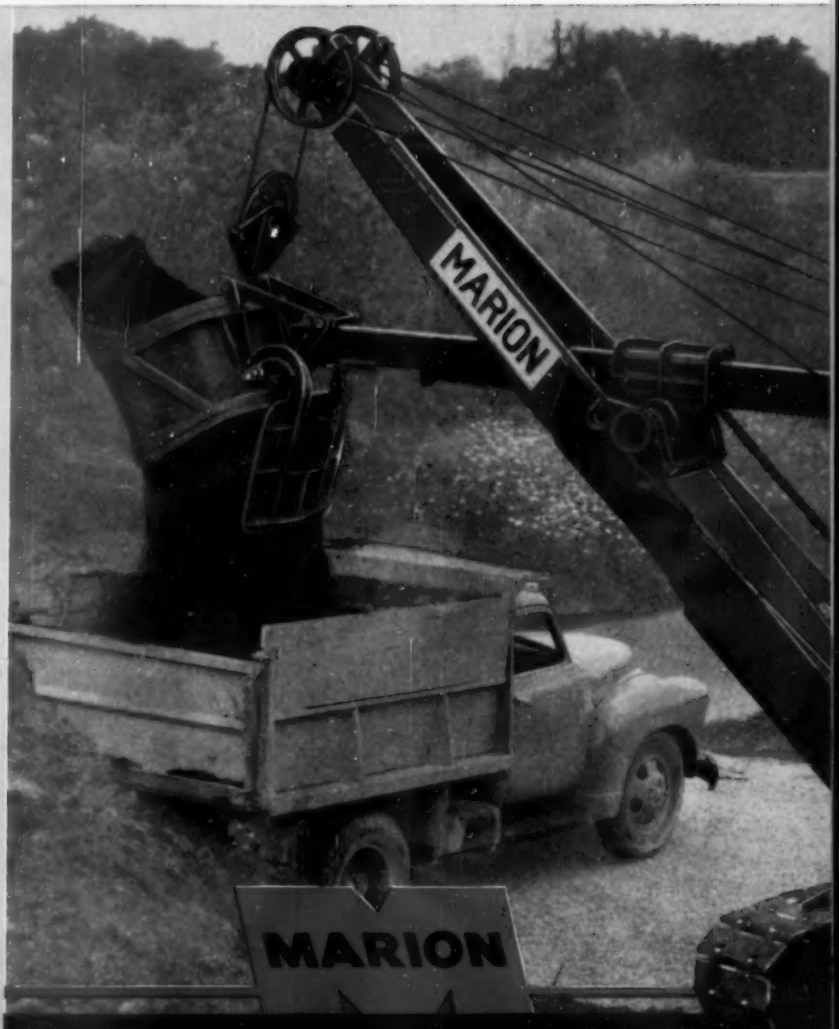
NEW 35-M

A Significant Development in Power Shovels









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- Heavy design and construction, plenty of power

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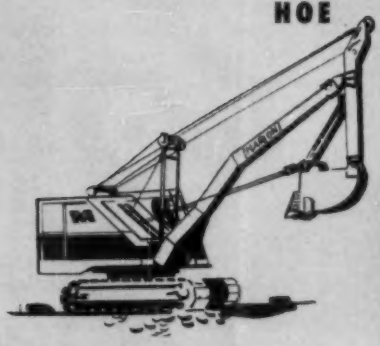
18 TON CRANE

- Independent boom hoist for power up, power down
- Optional features: torque converters, independent travel, high gantry



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News from the Field

Pontchartrain Causeway Open

Traffic has begun rolling over the 23.83-mile long Lake Pontchartrain Causeway at New Orleans, La. The structure is claimed to be the longest overwater bridge in the world.

The three-lane concrete causeway spans a 20-ft. deep lake. It is the major artery of the Greater New Orleans Expressway, a $51 million network of highways connecting with major roads to Texas and points north, northeast and west, plus Gulf Coast cities.

The bridge was opened to traffic August 31, four months ahead of schedule. Palmer & Baker, Mobile, Ala., design engineers, said that early completion of the bridge was possible because of mass production techniques employed by the contractor, the Louisiana Bridge Co., which is a joint venture of Brown & Root, Houston, Tex., and T. L. James & Co., Ruston, La.

Workmen of the Louisiana Bridge Co. prepare forms at an abutment. Deck sections were precast and prestressed on shore and towed to construction points on the lake.

At the outset, Louisiana Bridge erected a $7 million prefabricating and assembling plant on the north shore of the lake near Mandeville. Special prefabricating and curing processes used at the plant were designed specifically for expediting construction of the causeway. The plant worked two 10-hour shifts six days a week.

Components of the causeway were precast and prestressed in steel forms at the plant site. They were then assembled, loaded on barges and towed to construction points on the lake. Mass production techniques accomplished the construction in three phases: 1, barge-rigged units drove the 96-ft. cylindrical concrete piles, two at a time; 2, after the pile-driving operation, another unit put a steel-reinforced cap on the two piles and sealed it with concrete; 3, to complete the superstructure, a 56-ft.

Continued on page 42

Here's an aerial view of the new 24-mile long Lake Pontchartrain Causeway which is called the world's longest overwater bridge.

A Cat D315 Engine powers this ditcher working on a Houston residential development. Other Caterpillar equipment on this job includes six D8s, one D7, one D6 and two Scrapers.

Standardizing on rugged yellow equipment pays off two ways: (1) Big production at low cost and (2) fast, capable "one-stop" service from your Caterpillar Dealer.

WORKING IN TOUGH TEXAS GUMBO

F & C Equipment Co., Inc., Houston, specified a CAT* D315 Engine for this ditcher. Result: profitable production.

Digging a sewer line in Sharpstown, world's largest residential development near Houston, Texas, this Parsons Trenchliner worked 10 hours a day, 6 days a week. The F & C Equipment Co., Inc., which relies heavily on Caterpillar equipment, specified a Cat D315 Engine as original power. Field superintendent G. M. Strickler reports: "This is a big job and it takes the best equipment. We have to have something to produce with—and we find that Caterpillar units are the best so far!"

There's a reason they're "best so far!" Combining research with practical experience in the field, Caterpillar constantly improves its products to offer you the most modern equipment. Take its new line of heavy-duty engines, for instance. These rugged units are built to outwork comparable size engines of other makes. They pack more working power. They're sturdily built with such details as complete filter protection, bearings made of a special aluminum alloy, cylinder liners "Hi-Electro" hardened and chrome-faced piston rings. They use low-cost fuel without fouling. As a result, whether you use them in a ditcher, excavator or any other type of construction machinery, you can depend on them for big production at minimum cost.

Leading manufacturers of construction machinery are supplying Cat Diesels as original power. Or your Caterpillar Dealer is ready to install them as replacement power. A full line is available, capable of producing up to 650 HP (maximum output capacity). See your Caterpillar Dealer for details about these modern heavy-duty diesels!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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MODERN HEAVY-DUTY CONSTRUCTION POWER

News . . .

Continued from page 40

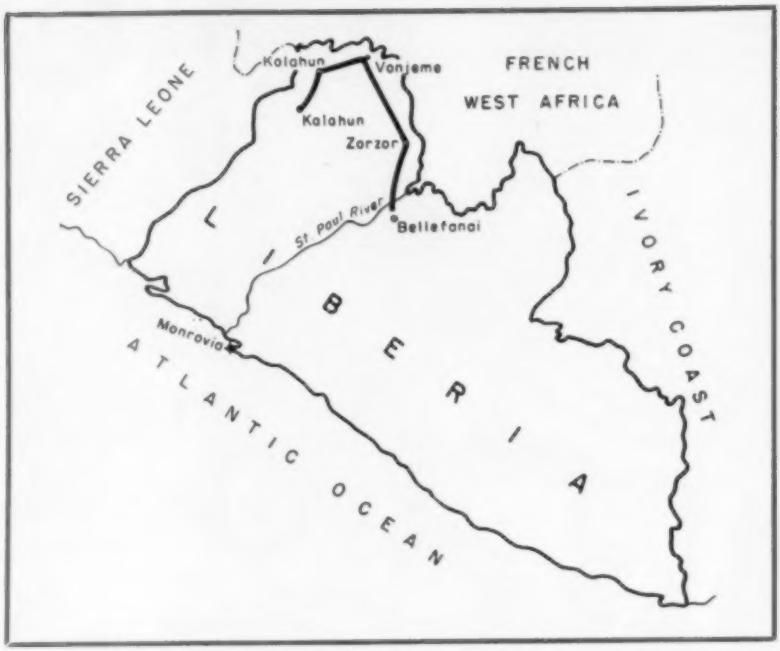
deck section was placed atop the piles and cap. Aluminum handrailing, expansion plates and electrical wiring were added.

The Raymond Concrete Pile Co., New York, N. Y., licensed Louisiana Bridge to manufacture and install Raymond's prestressed concrete cylinder piles. Exactly 4,886 Raymond 54-in. cylinder piles averaging 88 feet in length were driven. The job required 2,240 caps and 2,232 prestressed 185-ton deck slabs, 33 feet wide and 56 feet long. The roadway provides sufficient width for three vehicles to pass abreast. Three raised humps in the roadway will provide clearance for small craft, and two double-leaf bascule bridges for passage of larger craft.

Other bridge statistics include: 202,000 yards of concrete in the deck; 39,000 cubic yards of concrete in caps, including plugs; 3,000 tons of structural steel; 18,000 tons of reinforcing steel; 3,500 tons ⅜-in. strand stressing cable; and 3,200 tons of .192 stressing wire.

Equipment used included four 50-ton derrick barges, one 200-ton derrick barge, 36 barges, seven tugs, seven speedboats and launches and 15 trucks.

The project staff included: J. E. Walters, project manager; David Milham, chief engineer; James Quillan, general superintendent, day shift; and Walter Gasaway, general superintendent, night shift.



Liberia Starts Highway

Construction is scheduled to begin this fall on a new 150-mile highway in the interior of Liberia, an independent country on the Atlantic coast of Africa. Brown and Blauvelt, New York City consulting engineers, are supervising construction.

The highway, near the French West African border, will run in a northerly direction from just north of the town of Bellefanai to Zorzor. From Zorzor it will proceed in a northwesterly direction to Vonjeme, and then westerly to Kolahun and southwesterly to Kalahun. The highway will be of the secondary type made of a locally available compacted material similar to gravel.

The highway will open for development large areas which are now tropical jungle. It will provide access to known mineral resources and timber. It also is expected to help stabilize food prices in the country. Present transportation difficulties result in widely varying prices.

This project is part of a multi-million dollar highway program designed to improve transportation between inland and coastal towns. It is being financed with the aid of a loan of 12 million dollars from the U. S. Export-Import Bank. Thomas Buchanan, Liberia's secretary of public works and utilities, is directing the project.

Two or three years may be required to complete the project because of the undeveloped terrain. Liberian and American construction companies will build the highway.

These four Cat D8 tractors and three No. 80 Birtley scrapers, replacing hand labor, are being used in widening a portion of the south section of the Suez Canal in Egypt.

ASCE Honors Pair

Winners of two new American Society of Civil Engineers awards have been announced. Prof. Ralph E. Boeck of the department of civil engineering, Marquette University, Milwaukee, Wis., will receive the Ernest E. Howard award.

The Thomas A. Middlebrooks award will be shared by Allen J. Curtis, Culver City, Calif., a lecturer in engineering at the University of California at

Los Angeles, and Prof. Frank E. Richart, Jr., of the department of civil engineering, University of Florida, Gainesville.

The Ernest E. Howard award, for meritorious service in the field of structural engineering and construction, is in honor of the late past president of the ASCE.

The other award, in recognition of the outstanding professional accomplishments of the late Thomas A. Middlebrooks, internationally distinguished in the field of dam construction, is for a published paper designated by the Socicty's soil mechanics and foundations division.

Presentation of these two awards and others were to be made in Pittsburgh, Pa., October 17 at the national convention of the Society.

Portland Association Expands

Expansion of its field services to cement users has been announced by the Portland Cement Assn. A new regional office in Los Angeles, Calif., will supervise activities of the Los Angeles and Seattle (Wash.) district offices. New district offices are being opened in Baltimore, Md., Trenton, N. J., Portland, Me., and Louisville, Ky.

Academy Pipe Installed

Brown & Olds Plumbing & Heating Corp., El Paso, Tex., in August became the first contractor to complete a large-scale construction contract on the Air Force Academy north of Colorado Springs, Colo.

Brown & Olds built the academy's sanitary sewer system under a $270,000 contract. The firm began work last November 7. Some 50,000 feet of vitrified clay pipe were laid at depths ranging from four to 16 feet. Rock excavation totaled an estimated 3,000 cubic yards.

Allen Heads Group

G. Keith Allen, a reader in mining at the Royal School of Mines, University of London, England, has been named president of the Institution of Mining and Metallurgy, London, for 1957-58.

Moreell Gets Award

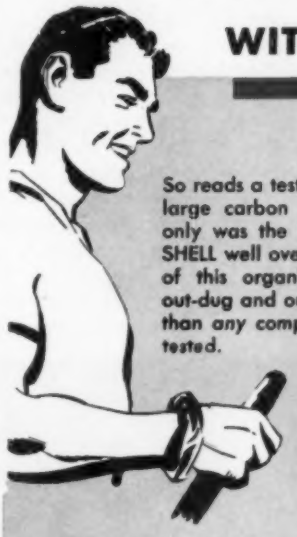
Admiral Ben Moreell, Pittsburgh, Pa., chairman of the board of the Jones & Laughlin Steel Corp., and the organizer and commander of the Navy's "Seabees" during World War II, has been named winner of the John Fritz Medal.

The John Fritz Medal Board of Award represents four major national

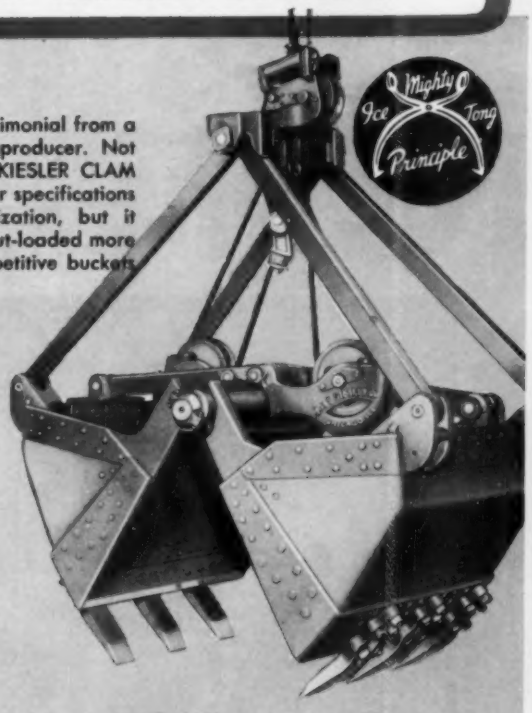
Continued on page 44

UNLOAD 1600 TON BARGES 46% FASTER

WITH KIESLER BUCKET!



So reads a testimonial from a large carbon producer. Not only was the KIESLER CLAM SHELL well over specifications of this organization, but it out-dug and out-loaded more than *any* competitive bucket tested.



There IS a reason: The KIESLER CLAM SHELL DEPENDS ON THE PROVEN PRINCIPLES OF LEVERAGE, NOT ON DEAD WEIGHT (COUNTER-WEIGHTS) FOR DIGGING ABILITY. The leverage of the 2-lever-arms exerts its powerful force directly to the shells and cutting edges, thus digging-in for a greater payload every time. And this maximum in power and performance is accomplished with a minimum amount of cable and reeving. The name KIESLER on your bucket is an assurance of superior performance and high-quality construction; backed up by over 64 years of bucket-manufacturing experience!

PROMPT SERVICE AVAILABLE

Factory service on Kiesler Buckets and as an accomodation on other makes, too. Whatever the problem, feel free to call on us.

GUARANTEE

Kiesler Buckets are guaranteed to outperform and do a bigger day's work than any other Bucket of equal weight, width and size, when properly reeved and operated.

JOS. F. KIESLER CO.

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News . . .

Continued from page 43

engineering organizations — American Society of Civil Engineers, the American Institute of Mining, Metallurgical and Petroleum Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers.

Admiral Moreell was cited as a "distinguished engineer and noted officer; builder of naval works in war, and in peace (an) eminent industrialist and civic leader; devoted servant of church and country."

Admiral Moreell was scheduled to receive his award October 17 in Pittsburgh at the annual convention of the American Society of Civil Engineers.

Hendrickson Teaches Safety

A safety poster program designed to stress the hazards of construction projects has been started in the elementary schools of Nassau County, N. Y., by Hendrickson Bros., Inc., Long Island's largest contracting firm.

Three posters, dealing with excavations, road flares and sewer pipe, have been prepared for the fall school term by Hendrickson's safety engineering department. Posters will be sent out each month to participating schools. Most of the posters will deal with construction hazards. Some, however, will feature various pieces of modern, costly construction equipment with explanations of their use.

Impetus for Hendrickson's program was supplied by the recent cave-in of a construction site in Brooklyn, N. Y., which killed six small children. Milton Hendrickson, young president of the Valley Stream firm (see *Excavating Engineer*, June 1956), contended that a child uneducated in safety would not be deterred from using a construction site for a playground by the presence of a watchman or fences.

Hendrickson said that an excellent program of teaching highway safety is being carried out in the schools, but said that no efforts have been made in explaining dangers presented at construction sites.

"Stressing highway safety alone is like teaching a soldier to duck only the .45 caliber bullets," Hendrickson said. "We have studied construction safety for many years and are anxious to inaugurate a school safety program designed to meet the present day needs."

DANGER!
This is a power shovel digging a big hole. The hole is called an excavation. The dirt the shovel digs up is soft and sandy. The sides of the hole are soft and sandy. The dirt does not stick together. It is very dangerous!
STAY AWAY FROM EXCAVATIONS!

Milton Hendrickson (left) and A. Halley Patterson display one of the posters which will be used in Nassau County (N. Y.) schools to show hazards on construction jobs.

Harold F. Hess

Harold F. Hess, 57, executive vice president of the Construction Industry Manufacturers Assn., died at his home in Evanston, Ill., August 3.

Born in Chicago, Mr. Hess served in the American Red Cross overseas during World War I while on leave from the Chicago Association of Commerce, where he started work as an office boy in 1915. He returned to the Association after the war and was there until 1921, when he became secretary-treasurer of the Interstate Merchants Council.

Later, he went to Lincoln, Ill., where he served as secretary of the Chamber of Commerce from 1924 to 1939. The Your Friendly Grocer Organization brought him back to Chicago in 1940. He was with the group until 1941 when he went to the Chicago Association of Credit Men as director of public relations and manager of sales and advertising. He was there until 1949 when he became the first executive vice president of the newly organized CIMA.

Equipment You Ought to Know About

Cummins Turbodiesel Engine

Manufacturer: Cummins Engine Co., Inc., Columbus, Ind.

Claims: Following three years of development and extensive field testing, a new 335-hp Cummins NRTO-6 Turbodiesel engine is now in production.

The NRTO-6 is equipped with an exclusive new exhaust gas turbocharger manufactured by Cummins. This new turbocharger, designed by Cummins as the T-590, plus the Cummins PT fuel system, give this engine ideal torque characteristics. The NRTO-6 develops its 335 hp at 2,100 rpm, with a 90° Fahrenheit intake air temperature at altitudes from zero to 4,000 feet. The NRTO-6 is down rated 1½% for each 1,000 feet of altitude over 4,000 feet.

Compared to a naturally aspirated engine of the same cubic inch displacement, the NRTO-6 develops 67½% more power. Likewise, the NRTO-6 produces 11½% more power than a mechanically supercharged engine of the same cubic inch displacement. The fuel rate is also lower than naturally as-

Continued on page 46

Now **ERIE** CLAMSHELL BUCKETS OFFER YOU 7 COMPLETE GROUPS

WHATEVER YOUR REQUIREMENT THERE'S AN **ERIE** CLAMSHELL BUCKET ENGINEERED ESPECIALLY FOR THE JOB

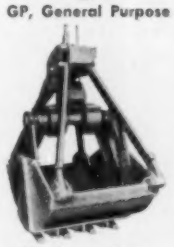
XLR, Extra Light Rehandler

LR, Light Rehandler

SR, Standard Rehandler

WR, Wide Rehandler

GP, General Purpose



HD, Heavy Duty

XHD, Extra Heavy Duty

Of all the buckets made, only Erie gives you this combination of sound engineering features:

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Manganese steel teeth and high carbon steel lips that bite up full payloads of even toughest clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps, and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low headroom for fast work in tight quarters; low center of gravity for easy positioning.

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JAN. 28—FEB. 2, 1957
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Makers of Extra Light, Light, Standard and Wide Rehandlers, General Purpose, Heavy Duty, Extra Heavy Duty, Electric and Mechanical Hook-On Clamshells.

New Equipment . . .

Continued from page 45

pirated or mechanically supercharged engines.

The NRTO-6 was designed by Cummins to meet the increasing power requirements without increasing size or weight for all types of equipment, including off-highway hauling units, scrapers, tractors, shovels, cranes, power units and heavy over-the-highway trucks.

The Cummins Turbodiesel is a 6-cylinder, 4-cycle engine with a 5⅛-in. x 6-in. bore and stroke and a piston displacement of 743 cubic inches. Compression ratio is 14.5 to 1.

Key to the high horsepower available from the NRTO-6 engine is the Cummins turbocharger. Here, normally wasted energy of the exhaust gas is used to create power. This is accomplished by piping the exhaust through a turbine which is one element of the turbocharger. The exhaust gas is directed against the turbine blades, causing the wheel to rotate at high speed. A centrifugal impeller, mounted on the same shaft, but in a separate housing, draws fresh air and blows it into the intake manifold and cylinders under pressure. More weight of fresh air is forced into the cylinders and a greater quantity of fuel can be burned completely, thus creating more power at the flywheel.

Mounting of Cummins T-590 turbochargers on the NRTO-6 can be effected in three ways—rear, top or side—depending on the application requirements of various power users.

All NRTO-6 engines are equipped with PT fuel systems. This fuel system allows the Turbodiesel to function on all commercially acceptable diesel fuel weights, although No. 2 diesel fuel or furnace oil is recommended for best performance and lowest operating costs. Simple in design and maintenance, the PT fuel system provides positive governor control for both idling and maximum speed; assures equal fuel delivery to all cylinders; has exceptional efficiency at all loads and speeds; and assures equal loading of component parts.

General Purpose Floodlight

Manufacturer: General Electric Co., Schenectady 5, N. Y.

Claims: General Electric is manufacturing a new and improved model of the L-69 general purpose floodlight. The new model is the L-69A.

A feature of the floodlight is a new

faceted rear reflector which combines with the front reflector to provide higher average maximum beam candlepower and optimum beam candlepower distribution.

The L-69A is constructed to allow for the selection of any one of three beam spreads for a specific application. The unit is available in any one of three widths—wide for the greatest dispersion of light, medium for middle-range illumination, and narrow for concentrated beam widths.

The unit's newly-designed socket and housing assembly makes possible a free circulation of air. The design retains the spun-sealed feature which helps keep the interior clean.

The sturdily-constructed 17-pound aluminum unit may be quickly and easily installed by a simple two-bolt mounting for horizontal positioning, or by a built-in wrench for vertical positioning. The accurate V-notch sight and easy-to-read vertical and horizontal degree scales simplify installation and aiming of the floodlight. The unit is readily accessible for cleaning and maintenance.

D8 Hydraulic Dozer

Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

Claims: Hydraulically-controlled No. 8U bulldozers are now available for use

with D8 tractors—either the torque converter or direct drive models. The bulldozer is operated by the No. 46 hydraulic control presently used for the No. 8S and No. 8A bulldozers.

Caterpillar has announced a 12% increase in horsepower rating for all D9 tractors now in production. Flywheel horsepower of the turbocharged crawler has been boosted from 286 to 320. Drawbar rating of the direct drive model has been increased from 230 to 260 hp.

Caterpillar engineers explained that the increased power output is being permitted as a result of a year's experience on all kinds of jobs with production machines.

Timken Rock Bits

Manufacturer: Timken Roller Bearing Co., Canton 6, Ohio.

Claims: A new line of rock bits of the tapered socket carbide insert type are now being manufactured by Timken at its Colorado Springs (Colo.) plant. The manufacturer says that the bits are in answer to the increasing use of light air-leg drills both in the United States and Canada.

Timken lists these advantages for the new bits: 1, they can be removed from the drill steel and discarded without throwing away the drill steel; 2, 4-point cross bits give longer life and greater footages between sharpenings; and 3, the tapered pin is easily fabricated on the drill steel.

New carbides in the cutting edges resist wear. The five front hole design is new. Clearance between bit wings is deeper and wider.

The bits, available from Timken dis-

tributors, come in sizes 1¼, 1⅜ and 1½ to fit the ⅞ hexagon or ⅞ quarter octagon tapered drill steels.

Bucket Loader Ripper

Manufacturer: Hensley Equipment Co., Inc., 800 Peralta Ave., San Leandro, Calif.

Claims: Hensley is producing a new-type ripper designed especially for speeding up bucket loader operations.

Cast of special alloy moly-manganese steel, the new bucket loader ripper clamps directly to the lower lip of any standard bucket loader.

Each ripper unit consists of two ripper teeth rigidly mounted 12 inches apart by three 1¼-in. Spec. 4140 heat-treated steel spacer bolts. The teeth are equipped with replaceable, self-sharpening wearpoints and are angled downward to provide an 8-in. penetration when the bottom of the bucket is parallel to the ground.

95-yd. Hopper Trailer

Manufacturer: Marion Metal Products Co., Marion, Ohio.

Claims: The world's largest bottom dump hopper trailer has been manufactured by Marion Metal Products and delivered to a coal company in West Virginia. The 70-ton trailer can carry 95 cubic yards of coal. It is 47 feet 4 inches long, 12 feet wide and 13 feet 6 inches high. A Model 803 Kenworth 400-hp diesel tractor, designed and built by the Kenworth Motor Truck Co., Seattle, Wash., powers the trailer. The tractor is 11 feet 6 inches wide and 12 feet 5 inches high.

The trailer will be used in the mountains to haul coal seven miles downhill to the tipple. When heaped, the trailer will carry in excess of 100 yards. Empty

Continued on page 51

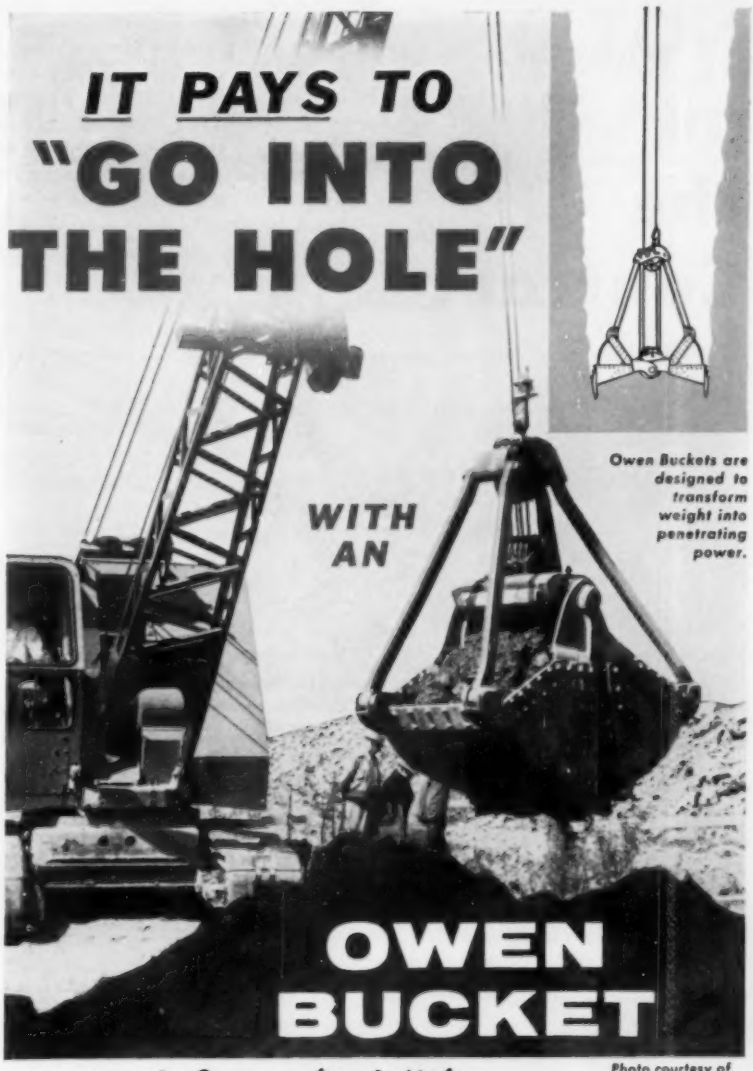

Photo courtesy of Bay City Shovels, Inc.

and Come Up With

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Here's an everyday "Going in the Hole" Operation where money is MADE not LOST.

Experienced excavating contractors and crane operators alike know that "Going in the Hole" with an OWEN BUCKET is profitable.

For better bucket maneuverability, maximum penetration, quick, full loading and rapid, complete discharge — you can't beat an OWEN BUCKET.

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NOT in the Contract

"I insured my voice," said the famous singer, "for $250,000."

"And what," asked his rival, "did you do with the money?"

A Frenchman, struggling with the English language, turned to an American friend for help. "What," he inquired, "is polar bear?"

"A polar bear? Oh, he lives way up north."

"Yes, but what does he do?" asked the Frenchman, puzzled.

"Oh, nothing—just sits on a cake of ice and eats fish."

"Zat settle. I will not accept."

"What do you mean, you won't accept?" It was the American's turn to be puzzled.

"Zut!" replied the Frenchman with heat. "They ask me to be polar bear at a funeral. Zat I shall not do."

A long-married couple was sitting in the living room. He was asleep in his easy chair and she was boredly watching television. Suddenly a tornado struck with great violence. It ripped the roof off the house, picked the man and woman up, swirled them into the air and deposited them gently a mile from home. The husband, seeing his wife sobbing, said: "Stop crying, can't you see we are safe?"

She whimpered: "I'm just crying because I am so happy. This is the first time we've been out together in ten years."

An enthusiastic golfer came home to dinner. During the meal his wife said, "Junior tells me he caddied for you this afternoon."

"Well, what do you know," said the husband, "I thought I had seen that kid somewhere."

A female shopper is a woman who can hurry through a department store aisle 18 inches wide without brushing against the piled-up glassware and then drive home and knock the doors off a 12-foot garage.

Grocer: "You want a pound of ochre? Is it red ochre for painting bricks?"

Small Boy: "No, it's tappy ochre wot Ma makes puddin' with."

"Any other questions."

"There really must be something to this prenatal influence. Before we married, my wife's favorite book was 'The Three Musketeers,' and we had triplets."

"Wow! My wife was reading 'The Birth of a Nation'!"

Wife: "Henry, dear, such an odd thing happened today. The clock fell off the wall, and if it had fallen a moment sooner it would have hit mother."

Husband: "I always said that clock was slow."

Financial Wizard: "Where in heaven's name does all that grocery money go that I give you?"

Wife: "Stand sidewise and look in the mirror!"

A beautiful girl was being tried for killing her husband. The jurors retired. They knew she was guilty, but they didn't want to sentence her because of her beauty—yet they feared to face their wives if they didn't. Finally, one of them happened to remember that the dead man had been an Elk. They passed this sentence: Twenty dollars fine for killing an Elk out of season.

An Indian petitioned a judge of an Arizona court to give him a shorter name. "What is your name now?" asked the judge.

"Chief Screeching Train Whistle," said the Indian.

"And to what do you wish to shorten it?" asked the judge.

The Indian folded his arms majestically and grunted, "Toots."

Bachelor: "How did you make out in that argument you had with your wife last night after I left?"

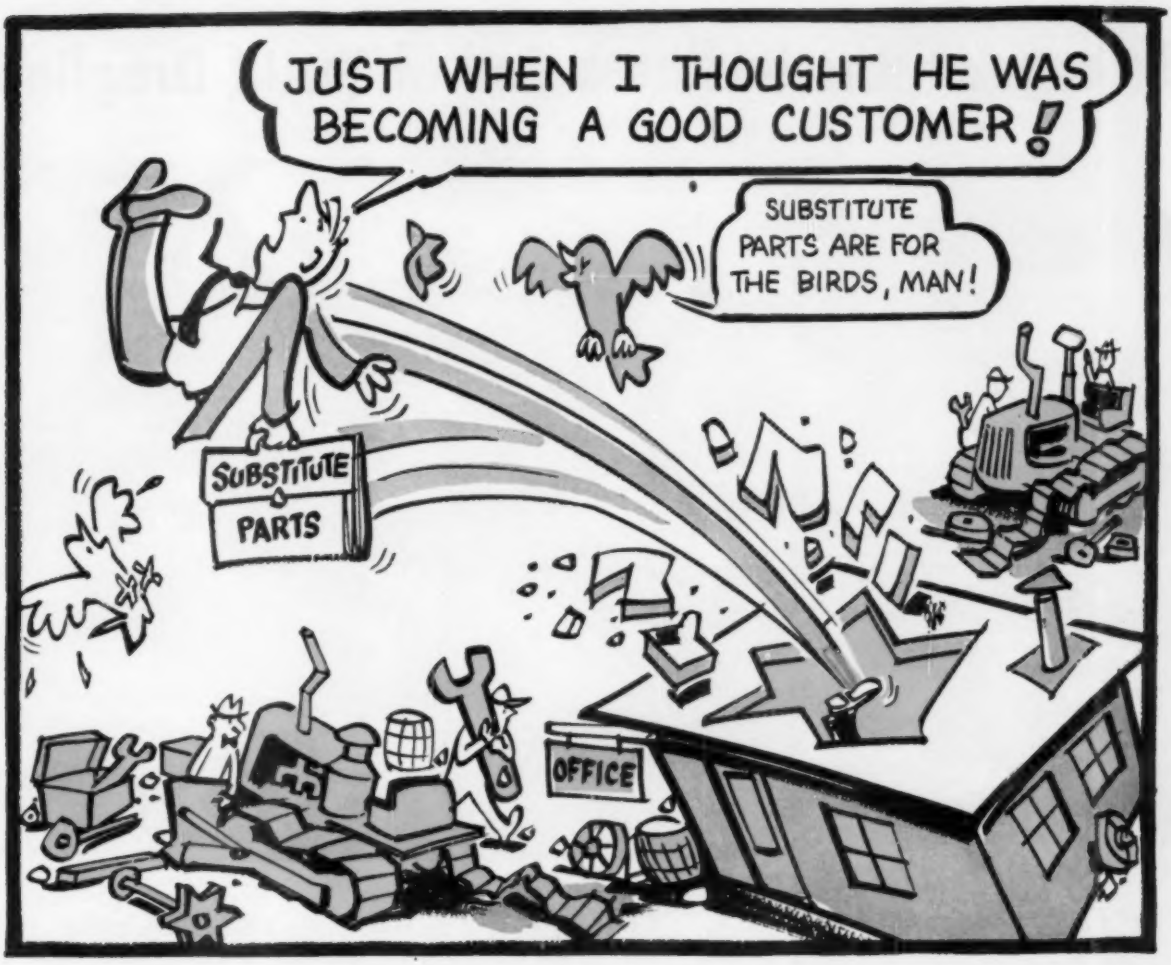
Husband: "Boy, when I got through with her she came crawling to me on her hands and knees."

Bachelor: "What did she say?"

Husband: "She said, 'Come out from under that bed, you coward'."

A salesman making a week's stay in town bought some limburger cheese to eat in his room. When he got ready to leave, he still had part of it left. Not wanting to pack it or leave it lying open in the room, he went to the window sill, carefully removed a plant from the pot, buried the cheese and replaced the plant.

A few days later he got a telegram from the hotel: "O.K., we give up. Where in hell did you hide it?"



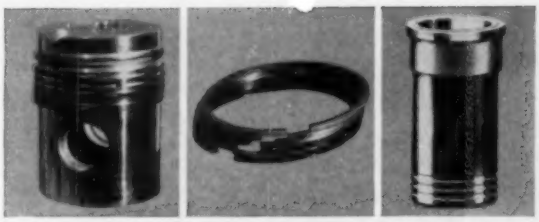
Somebody mention replacing a piston? Remember . . .

Caterpillar pistons are of special aluminum alloy—light, yet extremely heat-resistant and strong. CAT* rings are cast from fine grain alloy iron; their honed sides and lapped faces mean better sealing, smoother break-in. *Chrome*-plated rings offer increased resistance to wear. And 21 complete quality-control checks insure the fit, performance and long life of each Cat liner. You're sure of top quality, throughout.

With substitute parts, can you be sure of anything?

Better see your Caterpillar Dealer's Parts Representative—and get Cat original parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



Cat pistons, rings and liners are the result of years of Caterpillar experience and research. Their thousands of trouble-free working hours can cut your operating costs substantially. Why take a chance with substitutes?

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Here's Why a NEW BUCYRUS-ERIE BUCKET Belongs on the Business End of YOUR Dragline

The return on your entire investment in a dragline depends to a great extent on the efficiency of the bucket it swings. Get the most out of your dragline — equip it with a new, lightweight, high-output Bucyrus-Erie bucket. Your distributor will supply full information on these outstanding performers — available in light-, medium- and heavy-duty types, solid or perforated.

HERE are some of the reasons why a Bucyrus-Erie bucket will improve the over-all performance of **your** dragline.

FAST DIGGING, FULL LOADING: "Slicing-action" lip penetrates material quickly and easily. Tapered basket is scientifically shaped to load full and fast. Strong BECOLOY tooth bases hold teeth at proper angle for best digging and to provide full clearance for the bucket.

SMOOTH CARRYING: Proper flaring and balance minimizes bobbing and spilling. Strong, lightweight chains offer maximum strength and safety.

RAPID, CLEAN DUMPING: Smooth inside design and high arch contribute to fast, clean dumping. Free-rolling dump block with sealed tapered roller bearing assures smooth performance and long rope life.

LONG WEARING: Hardened BECOLOY teeth are easily replaced. Long clevis plates provide strong side-plate support. True circle rope sockets grip full spiral of six strands to save cable.

15R56C

South Milwaukee **BUCYRUS ERIE** Wisconsin

Continued from page 47

weights are 47,700 pounds for the trailer and 50,920 pounds for the tractor—or nearly 50 tons overall. Loaded with coal, the entire unit will weigh more than 119 tons.

The 803 tractor has a V-12 diesel engine with torque converter and semi-automatic transmission. It has power steering.

The trailer will be unloaded through two long bottom hopper doors, each measuring 26 x 2 feet. They open by gravity and are closed by air. Side panels on the trailer are fabricated of 8-gauge high tensile steel.

The tractor and trailer roll on 10 interchangeable 18.00 x 33, 32 ply nylon tires, nearly 6 feet in diameter. Each tire weighs 965 pounds.

The two units are connected by a free turning universal hitch weighing 2,500 pounds. The trailer revolves around a 9-in. diameter spindle.

Air brakes on each unit are 26 inches in diameter and 10 inches wide, with eight shoes apiece.

The rear axle on the trailer was forged from a 10½-in. square solid billet, turned down to 8-in. diameter at the ends. It weighs 6,500 pounds. A sloping steel shield on the rear of the trailer protects the axle and tires.

Dual Drum Paver

Manufacturer: Worthington Corp., Harrison, N. J.

Claims: A new Dual Drum road paver incorporating 17 major design modifications and operational features has been made available by Worthington.

Engine speed of the 34E Dual Drum Paver has been increased from 1,400 rpm to nearly 1,800 rpm. Hydraulically-operated steering brakes replace the foot-operated mechanical brake.

Other features of the paver include a new four-strand chain drive to replace the old triple-strand drive, and a 700-gallon auxiliary water tank that has been redesigned to eliminate buckling due to water surge and the possibility of welds cracking.

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Cardinal MOBILE HOMES
A NEW CONCEPT OF COMFORT AND LUXURY
In Cardinal Mobile Homes you enjoy a superb combination of everything needed to give you and your family "living — as you like it". Here is modern, distinctive exterior styling . . . spacious interiors featuring rich, colorful luxurious furnishings and decor . . . modern utilities planned for comfortable, convenient, "take-it-easy" living. A model for every need, taste and budget. Write for Folder — for complete information and nearest dealer.
CARDINAL INDUSTRIES, Middlebury 4, Indiana

New Industrial Tractor Line

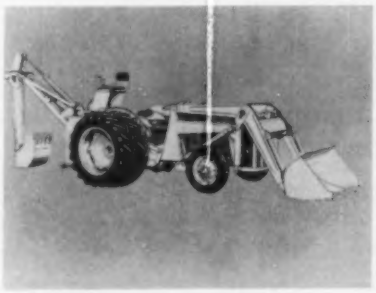
Manufacturer: Massey-Harris-Ferguson, Inc., Racine, Wis.

Claims: A full line of light and medium-duty utility tractors and allied equipment has been introduced by the new Industrial Div., Massey-Harris-Ferguson, Inc.

The new Work Bull line which consists of five tractors and allied attachments, is designed to fill a gap between light and heavy equipment in three areas.

The machines can be used as primary equipment on small, work-and-run jobs; back-up machines for higher priced, single-purpose equipment; and versatile clean-up and utility tools.

Mid-Western Industries, Wichita, Kan., makers of the Davis line of front and rear-end attachments for industrial tractors, will supply a special line of equipment for the Work Bulls. These attachments will complement those which have been engineered by M-H-F. A total of 20 hydraulically-controlled attachments will be offered.



Considered the most widely applicable unit, the M-H-F Work Bull Model 202 is designed for such uses as digging trenches, spreading top soil, mowing and landscaping. Featuring a 134-cu. in. gasoline engine, the 202 delivers 34 hp and can mount any of 20 attachments, including front end loaders, backhoes, mowers and sweepers. It is capable of road speeds up to 15 mph. Recommended bucket loader capacities range from 9 to 11 cubic feet, and backhoe buckets from 12 to 36 inches, depending upon the material. The fork-lift attachment on the 202 has a capacity of 2,000 pounds. Other features include heavy-duty front axle and support; dual-range transmission with six speeds forward and two reverse; individual rear-wheel brakes; power steering and complete hydraulic control; and 12-volt electrical system.

The larger Model 303 can be applied to light earth-moving and materials handling operations for a variety of contracting and industrial applications. The 303, with a 208-cu. in. engine, delivers 42 hp and has an in-line transmission with five speeds forward and reverse. Road speeds up to 15 mph are possible. A diesel engine and constant power steering are offered as optional extras.

The Work Bull Model 404 is the biggest tractor in the line. Delivering 52 hp with its 277-cu. in. high-torque engine, the 404 handles the bigger buckets, loaders and hoes. In addition to hydraulic control of both tractor and attachments, it features a five-speed

GET 59% MORE LIGHT OUTPUT...

From Model 120 500 Watt

STURDILITE
FLOOD LAMP

- Steps up night-time production —
- Adds to SAFETY! . . .
- Especially Adapted for Operations Such as Open Pit Mining, Stripping, Dredging, Excavating, Crushing and Mix Plants, Logging, Road Building, Drilling, Quarrying, Etc.

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PHOENIX PRODUCTS CO.
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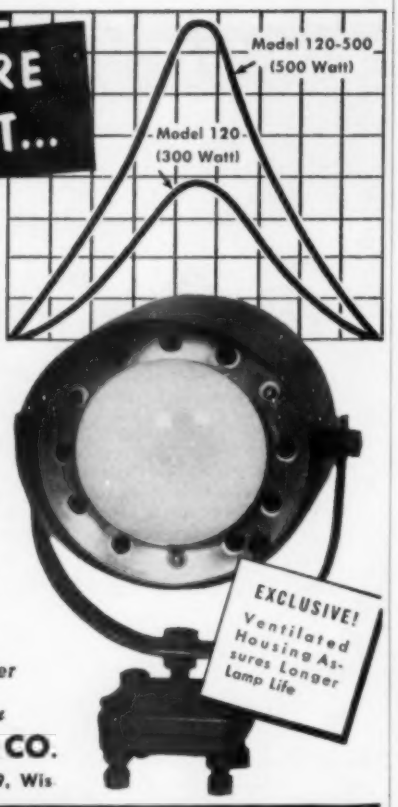


transmission; gear-driven differential; heavy-duty front axle and support; worm and sector steering (power steering optional); heavy-duty clutch; full pressure lubrication; and a 12-volt electrical system. Diesel engine and power take-off are available as optional equipment.

A torque converter, power clutch and optional power steering highlight the Pit Bull, a shovel-loader that can handle a wide variety of auxiliary attachments. Gasoline engine delivers 42 hp. Reversing clutches permit direction changes without shifting. This feature, in combination with the torque converter, makes the Pit Bull particularly valuable in stockpiling operations.

The Model 202 forklift is based on a specially built unit, utilizing the basic 202 in reversed position with the load over the large drive wheels. If desired, the fork arms can be easily detached and replaced with either a blade or bucket to handle utility work.

Pit Bull attachments include 7/8-yd. capacity material bucket, hydraulically angled 8-ft. dozer blade, hydraulically driven and angled 96-in. broom, 12 to 36-in. backhoe, 2,000-lb. capacity fork lift, 72-in. scarifier attachment for the loader, and hydraulically controlled utility crane.

Reel, rotary and side-mounted mowers are available for the Work Bull 202. Side mounted cutter bar mowers are available in 5, 6 and 7-ft. width and are designed to cut up to four acres an hour. Hydraulic angle adjustment permits close cut over uneven ground, an advantage on highway shoulder work.

Other available attachments that further increase versatility of the new line include fork lift, graders, angle-dozers and dozer blades, snow plows, sweeper-brooms, post hole diggers, rotary trenchers, pipe and cable layers, winches, utility booms, scarifiers and pintle hooks or swinging drawbars for hauling operations.

Davis loaders are available in 9 and 11-cu. ft. sizes for the 202. For the 303 and 404 models, 11-cu. ft. and 5/8-yd. Davis loaders are offered.

Koehring Truck Crane

Manufacturer: Koehring Co., Milwaukee 16, Wis.

Claims: A truck crane version of the recently improved Koehring Model 305 excavator is now available. As a crane, the Model 305 lifts loads up to 25 tons and its road travel speed is 30 mph.

The unit is easily adaptable to any type of crane operation, including lift, clamshell, dragline, grapple, magnet and pile driving work. For special high lift crane service, the standard 30-ft. main boom can be extended to a maximum allowable 100-ft. length. In addition, a jib boom up to 30 feet long can be added.

The 305 truck chassis is provided with five main and two auxiliary forward speeds. Wheelbase is 205 inches with 9-ft. axles to provide greater lift capacity over the side and rear. Front and rear outriggers provide extra support during stationary lifting operations.

Le Roi Wagon Drill

Manufacturer: Le Roi Div., Westinghouse Air Brake Co., Milwaukee, 1, Wis.

Claims: Le Roi has marketed a new, heavy-duty wagon drill with the feed shell behind the center line of the large wheel axles and with an air motor feed.

Known as the DR40, the drill is designed for vertical or horizontal drilling in hard formations. The light drill obtains added strength through the use of a light-weight, welded tubular U bar. Adjustable swivel wheels are locked into position for line or face drilling. Includ-

ing feed shell and D14DR 4-in. drifter, the entire unit weighs 1,500 pounds.

The drifter weighs 126 pounds. It is used with a 13-ft. feed shell weighing 400 pounds with a feed travel of 10 feet. It is possible to drill holes at any angle in any direction to a depth of 24 feet without using steel racks.

Centralizer arms securely align the steel with the built-in replaceable bushing. U-bar construction allows drilling in nearly any position—vertical, overhead horizontal and toe holes four inches above the ground. The latter method is possible by positioning the drifter beneath the feed cylinder.

The air motor used on the DR40 is of double lobe cylinder construction. A 7-blade rotor provides alternate power from opposed power lobes, producing 14 power impulses in every revolution of the motor.

Standard equipment includes a 2-gallon line oiler. Operating on the positive pressure principle, oil feeds only on air movement and does not splurge when the flow of air is stopped. Two 6.00-16 tires and one 4.00-8 caster tire complete the three-wheel carriage.

Enamel and Primer

Manufacturer: Robeson Preservo Co., 161 Merchant St., Port Huron, Mich.

Claims: Robeson has announced a new enamel and a rust-resistant top coat primer for use on all heavy equipment, including earth movers, tractors, trucks, cement mixers and gravel towers, among other things.

The enamel comes in 14 high gloss colors and works equally well with brush

Continued on page 55

This remarkable Rogers trailer meets rigid requirements laid down by Frank W. Hake, heavy hauler of Philadelphia, Penna.

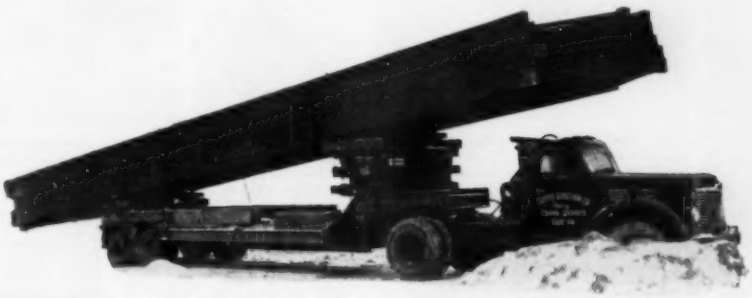
It incorporates ideas submitted by a large company for whom Hake's organization handles many heavy hauls of which this 91 ton transformer is an example.

It is significant in the unusually low weight imposed on the highway.

This is an example of how this organization of long, specialized experience can interpret a new and difficult problem and develop a product to meet these exacting demands.

SPECIFICATIONS

Length overall	106 feet
Width	12 feet
Height with Load	17½ feet
Number of tires	36
Total Weight	241 tons



The LT Trailer made of alloy steel for lightness with strength.

✓Check and you'll choose a ROGERS

Whether you need a special or a conventional trailer, contact Rogers. Then if you investigate thoroughly, we believe you'll "Choose a Rogers." Write for the new catalog.

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Bonus Quality
saves you money

These jobs profited from a Bucyrus-Erie Dragline...yours can too!

ST. LAWRENCE SEAWAY. For larger, more demanding excavation projects like the Long Sault Canal on the Seaway, contractors prefer big-capacity machines like this Bucyrus-Erie 71-B with 3-yd. bucket.

SAN FERNANDO VALLEY, CALIF. This 54-B with 3-yd. bucket working on a Los Angeles River flood control project for the U. S. Corps of Engineers, demonstrates day after day the big output and dependability for which Bucyrus-Erie machines are well known.

SELMER, TENN. Bucyrus-Erie 15-B equipped with ½-yd. bucket cleans out a ½-mile drainage ditch on a Tennessee farm. You'll find all the essentials of profitable dragline service in Bucyrus-Eries because they are built for superlative service on jobs like yours!

LITTLE ROCK, ARK. Working in gumbo and hard clay, this 22-B with ¾-yd. bucket digs a V-type irrigation ditch for rice fields near Little Rock. Users find that Bucyrus-Erie Bonus Quality pays off in any type of digging.

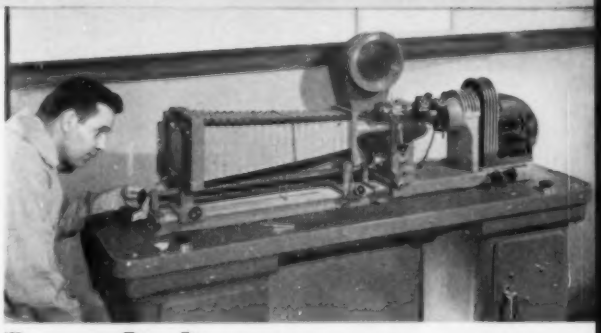
WHATEVER the job, it can profit from the extra working ability of a Bucyrus-Erie dragline. From the ground up, these machines are designed and built to put power to work moving dirt with maximum efficiency.

See your Bucyrus-Erie distributor soon and have him give you all the facts on draglines from ⅜- to 4-cu. yd.

212E56C

BUCYRUS ERIE

SOUTH MILWAUKEE
WISCONSIN



Bonus Quality This research technician is examining the grain structure of a piece of steel. All steel used by Bucyrus-Erie undergoes rigid tests to make sure it comes up to highest standards. This means machines that cost less to maintain and offer many years of extra service.

New Equipment . . .

Continued from page 53

or in spray applications. The requirement for any metal is one coat of primer and one of finish. The primer is fast drying.

If metal does not require an abrasive-resistant coating, but must be protected from rust, the primer coat alone is sufficient.

A special thinner for the enamel also is available.

Fordson Diesel Models

Manufacturer: Tractor and Implement Div., Ford Motor Co., Birmingham, Mich.

Claims: Ford has announced two new models of the Fordson Major Diesel tractor designed for use with equipment such as loaders, trenchers and diggers where hydraulic lift and implement linkages are not required.

With the exception of the hydraulic system and linkages, the utility models have all of the features of the standard FMD four-wheel tractors, including six forward and two reverse speeds, sealed beam headlights and taillight, adjustable swinging drawbar, 12-volt electric system and starter motor, oil bath air cleaner, transmission-type power take-off and 600-pound wheel weights.

Fordson Major Diesel tractors are being equipped with a new "proofmeter," an all-in-one instrument that indicates engine revolutions per minute, total hours of engine operation, and ground, power take-off and belt pulley speeds.

The FMD-U12, like the standard FMD-12, has 12-in. rear tires, while the FMD-U14, like the FMD-14, has 14-in. rear tires. All four models are equipped with 7:50 x 16 front tires. The models with 12-in. rear tires have rear tread adjustments of 52 and 72 inches—the 14-in. tire models can be set at 58 or 62-in. rear wheel spacings.

Oshkosh Truck Series

Manufacturer: Oshkosh Motor Truck, Inc., Oshkosh, Wis.

Claims: Oshkosh has made available a new, heavy-duty all-wheel drive truck series engineered and built especially for gravel hauling and highway maintenance. Trucks in this series are an adaptation of the Oshkosh "50-50" ready-mixed concrete carrier with the engine cantilevered over the front axle.

The trucks are designed for year-around use. They are powered by either a Continental 427-cu. in. gasoline engine or a Cummins JT-600 diesel engine. They have an 8½-yd. gravel dump body, carry a payload of 18,000 pounds on the front axle, and are built for mounting an underbody blade for road grading work.

The wheelbase is 144 inches. The trucks are equipped with Vickers power steering.

Pipe Welding Electrode

Manufacturer: Lincoln Electric Co., Cleveland 17, Ohio.

Claims: Lincoln has announced a new E-6010 electrode, Fleetweld 5-P, suitable for all E-6010 applications, but especially designed for pipe welding. The electrode produces a flat-shaped bead in an even deposit from which slag is easily removed.

Fleetweld 5-P conforms to AWS E-6010 requirements. It is available in ⅛ and $\frac{5}{32}$-in. diameter sizes.

Clark Tractor Logger

Manufacturer: Construction Machinery Div., Clark Equipment Co., Pipestone Rd., P. O. Box 599, Benton Harbor, Mich.

Claims: Clark has introduced the Model 175 tractor logger, which features power train, with heavy torque converter, power shift transmission and planetary wheel drive and steer axles.

The rubber-tired logger lifts 10 tons at 0 mph; at 4 mph, it is rated at 7 tons. Two specially designed log clamps can handle a log six feet in diameter or several smaller logs. Hydraulically-operated, the clamps close to 16 inches or can be adapted to close entirely.

When fully raised to a height of 11 feet 7 inches, the 3 foot long lifting forks can be tilted downward at a 39° angle, enabling the operator to reach over a row of logs for pick-up. Spikes on the bottom and top sides of the clamps permit the operator to pull a log in or cast it away.

The torque converter automatically boosts torque up to 300% as drawbar requirements increase, providing an increasing flow of power to pull through ruts or move heavy loads. Operator fatigue and maintenance problems are reduced by the elimination of the conventional clutch.

Driving controls consist of two finger-tip levers on the steering column, one for high-low, the other for forward-reverse. The machine's top speed is 27 mph.

The logger has four-wheel drive and rear-wheel power steering, with an oscillating rear axle that maintains ground contact over rough terrain.

Final planetary reductions in the wheels reduce the torque load on axle shafts by 70%. Final reduction is as close as possible to the point where the final tractive effort is applied.

Weighing 17 tons, the logger has vacuum power boosted four-wheel brakes and four 18.00-25.20 ply tires.

Starting is facilitated by a 24-volt electrical system. The logger has a 50-gallon fuel tank.

The logger is 8 feet 3 inches high over the air cleaner cap, 8 feet 7 inches wide over the tires and 21 feet 11 inches long with the forks at carry position. It is available in both gasoline and diesel six-cylinder engine models, rated at 127 and 133 hp.

ENGINEER'S TRANSITS

At Tremendous Savings!

This 26 Power Heavy-Duty Model T-26 Only

$345.00

EQUAL IN QUALITY TO TRANSITS SELLING FROM $650 TO $750.00.

A precision instrument. Minimum focus is 6½ ft. Magnification is 26x. Readings down to 20 seconds. MODEL T-18, is a Utility Model for only $189.50. Save over $300 on this brand new equipment. Atlas Transits are field tested and accepted by engineers, contractors, builders. Complete with Tripod and Accessories. Sold only on a money back guarantee. Non rated D & B firms — $25 deposit — balance C.O.D. Send to Dept. EE.

ATLAS INSTRUMENT CO.

611 PEARL ST. SIOUX CITY, IOWA

Equipped with a 4-yd. dipper, this shovel is digging rich bituminous coal which it will load into the large Euclid unit for transportation to the tipple ½-mile away.

Riverview . . .

Continued from page 37

line. The 480-W then walks in and is ready to go to work. After the walker strips the overburden and moves along, the Cat D6 arrives and cleans the coal seam in preparation for the coal loading shovel and coal haulers.

Strip Hillsides

When we visited this operation, the dragline was busy spoil casting overburden at a fast, steady pace. The mine is being worked in 80-ft. benches by the hillside rim stripping method. The machine skirts the hill perimeters, then benches inward to the hill center as it makes a shelf which can be efficiently worked by the coal loader. No hauling of overburden is necessary because the 160-ft. boom of the dragline enables it to reach out and neatly pile the overburden on mined areas. The coal is removed, and then the process is repeated as another section is uncovered.

A Northwest 80-D, equipped with a 4-yd. dipper and powered by a Murphy diesel, is kept busy removing the parting and loading coal into four bottom-dump coal haulers. An older Northwest 80-D with a 3½-yd. dipper is held in reserve and used to strip parting or load coal as required. Two of the haulers are 25-ton Euclids, powered by 200-hp Cummins diesels, while the other two are 20-ton Euclids with 165-hp Cummins engines. The bottom dump Euc haulers are loaded in three to five minutes, and the one-half mile haul to the tipple takes about 15 minutes, round trip. Each coal hauler makes approximately 25 trips daily when enough railroad cars are available. During the course of a working day, each hauler consumes about 20 gallons of diesel fuel.

The haul roads, grades of which are kept below 10%, are maintained in excellent shape by the D6. At the time of our visit, the roads were solidly packed because there had been no rain for a few days. Jim Hurst said that blasting frequently creates a mud problem in the mine. The blast often releases pent-up water from pockets in the ground, bogging haul roads. When this happens, the call goes out for the D6 and, in a matter of minutes, the dozer has the flooded area packed down solid again.

At the tipple, the Eucs drop their loads faster than it can be recorded here—in about 8 seconds. The dumping operation takes little time because no spreading is necessary at the hopper. The vibrator has a capacity of 300 tons per hour, and the coal is processed into

Two tasks are assigned to Riverview's Cat D6 tractor—clearing away coal dropped in the loading operation and maintaining haul roads. The mine also uses a D9.

Powered by a Ford engine, a McCarthy 103 drill bores a 6½-in. blast hole into side of the overburden. Average time to drill and load a hole is 1 hour and 15 minutes.

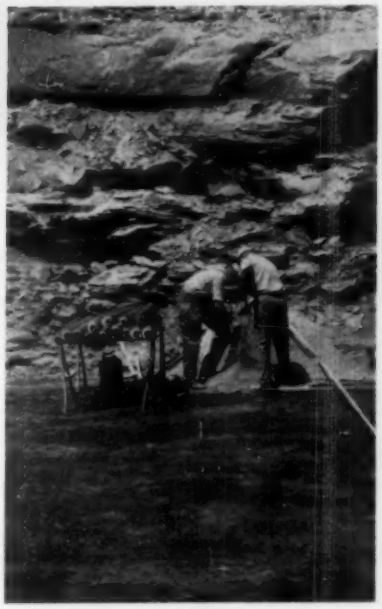
three sizes: 2 x 0, 6 x 2 (egg) and 4 x 2. In winter, a 6-in. lump size is screened. Because no washing or treating is required, the coal swiftly passes through the tipple and is soon loaded into waiting Illinois Central coal cars which handle all shipments that leave the mine. The sales agency for the Riverview mine is Walter Bledsoe & Co., Terre Haute, Ind.

Winter shipments are made to coal dealers in Kentucky, Illinois, Indiana, Iowa, Missouri, Tennessee and the surrounding states. Probably the biggest single customer for this rich coal is the Tennessee Valley Authority at Johnsenville, Tenn., which uses it for steam generation.

Mine Facilities

A 100 x 40-ft. garage houses maintenance facilities at the Riverview mine. It is also used for inside parking of the coal haulers. At the front of this building are two small offices where company personnel carry on the business end of the mine operation. The welding, lubricating, greasing and general repair work necessary to keep the working equipment in good shape are done in the garage. Two men are assigned to this job. Lubricating oil and grease are supplied by Standard Oil Co., Ohio Oil and Whitmore.

The payroll at the strip mine totals 36 men. Stripping is handled in three eight-hour shifts, six days a week. Loading and hauling of coal is done during one shift, five days per week—when railroad cars are available. Drilling and hole charging are carried on during one shift and for six days a week. Hilary Hurst is particularly proud of Riverview's safety record. No serious accident, in fact, not even a broken bone, has occurred in the six years since the mine was opened.



Two powder men pack a hole prior to shooting. Holes are drilled 78 feet deep.

"Just in case they're needed though," Hilary added, "first aid kits and stretchers are kept close at hand in the pit area and at the tipple. The mine is checked at least once every three months by state and federal inspectors because Riverview must abide by strip mine rules set up by the state of Kentucky."

Much experience in coal mining is readily evident when looking over the work records of the corporation personnel. All the front office people had worked for 20th Century Coal Co. for a number of years before the Riverview concern was founded. In addition to Kermit and Hilary Hurst, other key mine personnel are Nolan Ranney, vice

Continued on page 60

Riverview's tipple is capable of handling 300 tons of coal per hour, depending on the availability of railroad cars. The Hurst brothers founded their company in 1950.

UP WITH PROFITS
DOWN WITH... EXPENSES!
A more efficient dragline bucket scoops up bigger profits for you. Omaha Dragline Buckets eliminate unnecessary weight making room for a bigger payload. Time and dollar consuming field repairs are reduced. You can't put a better bucket than an 'Omaha' on any job.
Write today for catalog giving specifications for four types available.
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DRAGLINE BUCKET
DRAKE-WILLIAMS MOUNT • OMAHA, NEBR.

New Trade Literature

Subject: **CF&I Products**

Content: Principal products of the Colorado Fuel and Iron Corp. are described and illustrated in a 70-page catalog. CF&I products serve, among others, the construction and mining industries. A directory of CF&I plants and sales offices throughout the country also is included in the catalog.

Where to get: Colorado Fuel and Iron Corp., Advertising Office, 575 Madison Ave., New York, N. Y.

Subject: **Allis-Chalmers Literature**

Content: Allis-Chalmers has issued three new pieces of literature. Catalog MS-1101 describes the HD-6G tractor shovel which was added to the A-C line late last year. *Logging With Allis-Chalmers* (Form MS-1131) is a revision of the original market booklet published several years ago as a review of A-C crawler tractors, motor graders, motor scrapers, engines and other equipment applicable to a wide variety of jobs in the lumber industry. *Facts* is a 16-page illustrated booklet which describes Allis-Chalmers' line of construction equipment, including tractors, tractor shovels, motor scrapers, pull-type scrapers and motor graders. Dealer services also are described and illustrated.

Where to get: Tractor Group, Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Subject: **Thor Power Tools.**

Content: A revised catalog lists the complete Thor line of mining and contractors' power tools. Specifications and information are given on a number of tools Thor has introduced since the first edition of the catalog. These include the SW-1 and BW-5 wagon drills, 15 utility hammer, 16M clay digger, 37 and 77 sinker rock drills, 82CB crust breaker, 390 push-feed drill, 680 leg, 5V air grinder, 80 impact wrench on raiser leg, and 56 electric speedwrench. Lead-off pages of each section of the catalog show schematic drawings of the basic tools which are covered in the section, with detailed information on engineering features and design.

Where to get: Thor Power Tool Co., Aurora, Ill.

Subject: **Caterpillar Literature**

Content: Capterpillar has issued four new pieces of literature. *New Life for Old Machines* is a booklet which deals with machines powered by engines, including cranes and crushers. The booklet suggests that the customer or owner should periodically examine his operating cost in downtime and repairs. Several actual job installations are discussed using dollar and cents values. Ask for form DE635. Operating and mechanical features of the No. 112 motor grader are discussed in a booklet which has many pictures. Ask for form 31903. *Basic Blading*, a 32-page illustrated manual, is designed to help new motor grader operators and serve as a review for experienced operators. Illustrations cover the use of controls, basic blade positions and their applications, and the control positions to accomplish many of the jobs a motor grader does. Ask for form DE628. *A Brief Case for Cat Filters* is an 8-page pamphlet which claims that Caterpillar oil filters help increase engine life. The brochure discusses the requirements of effective filtration. Ask for form DE629. Forms DE628 and DE629 are also available in Spanish, French and Portugese.

Where to get: Caterpillar dealers or Caterpillar Tractor Co., Peoria, Ill.

Subject: **ARBA Directory**

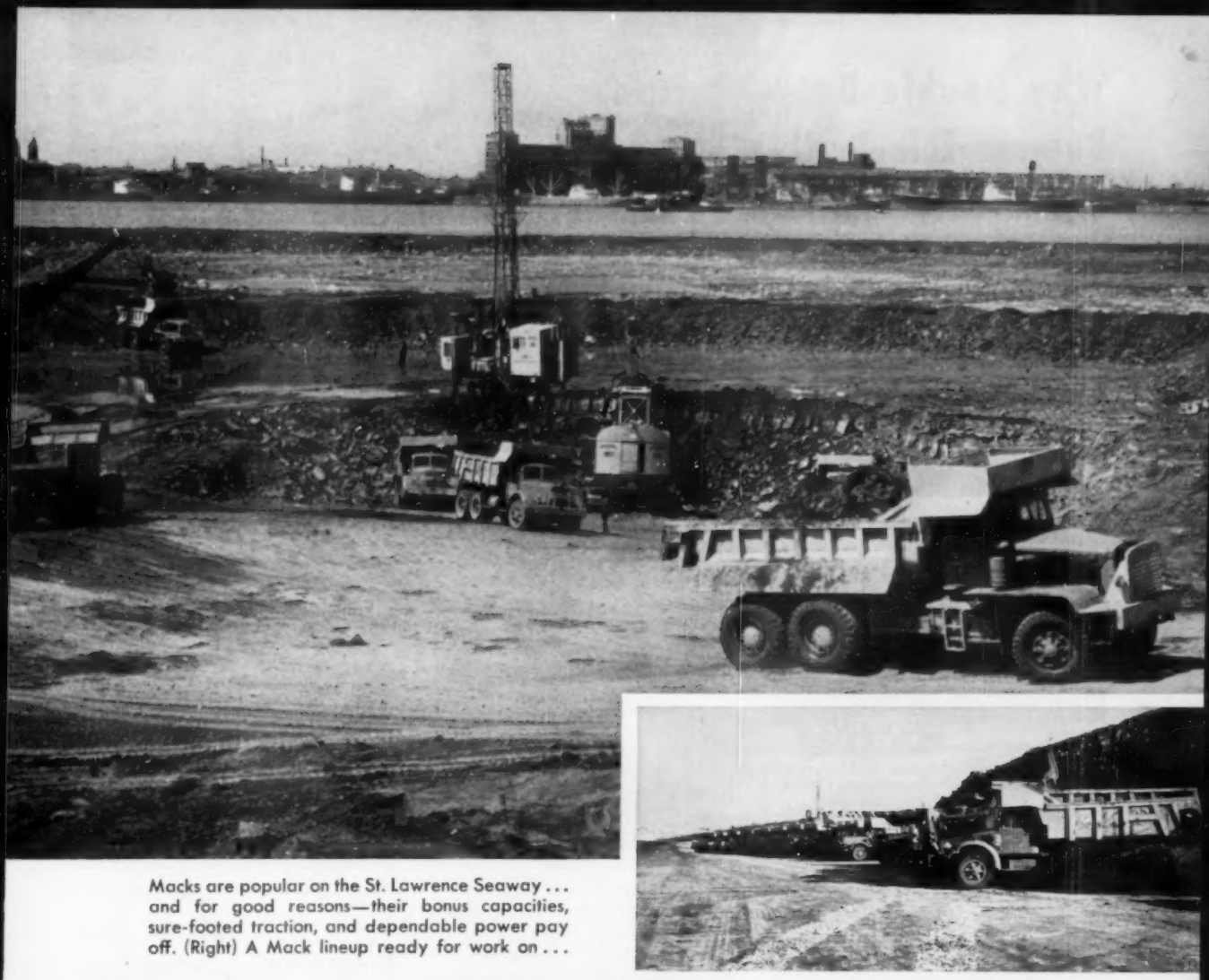
Content: The 1956 edition of the directory of *Highway Officials and Engineers* published by the American Road Builders' Assn., is available for distribution. Among other things, the pocket-sized handbook contains, more than 1,500 names, titles and addresses of administrative engineers and officials in the 48 state highway departments and the District of Columbia. Price is $1.

Where to get: American Road Builders' Assn., 600 World Center Building, Washington 6, D. C.

Subject: **I-H Roadbuilding Machinery**

Content: A 12-page folder describes

Continued on page 61.



Macks are popular on the St. Lawrence Seaway... and for good reasons—their bonus capacities, sure-footed traction, and dependable power pay off. (Right) A Mack lineup ready for work on...

The St. Lawrence Seaway... a big job for big trucks...

...a job for a lot of heavy-duty Macks—that's the conclusion of Miron & Freres, Limited, the contractor working on the Cote St. Catherine section of the St. Lawrence Seaway. They are using Mack off-highway dumpers exclusively, over 30 of them, for their big earth-moving job. And their big Macks are paying off for them in real hauling efficiency—plenty of power for big payloads with minimum maintenance costs... even during winter operations.

Like these big dumpers, all of Mack's heavy-duty construction chassis for concrete mixers, tractors, and flat bed trucks can be relied upon for outstanding performance. Rugged construction, dependable power, low maintenance, as well as such features as Mack's Balanced Bogie and exclusive Power Divider—the four-wheel tandem drive that delivers power only to the wheels with traction—make Macks the logical choice for getting jobs done on schedule, and at a profit.

For full details, see your Mack Branch or Distributor. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

4398

MACK
first name for
TRUCKS

Why Double-Duty Bucyrus-Erie Drills are most preferred

In profitable dual-purpose contracting, hard-hitting 20-W and 22-W drills are overwhelming favorites. With direct drive from jackshaft to spudding gear and a shock absorber in the derrick head to provide snap, you get a wallop that makes quick work of 4- to 8-in. blast holes and cuts your rock preparation costs. All steel welded construction keeps maintenance low, saves on repair costs.

During a lull in blast hole work, these same versatile rigs have all the spooling capacity needed to drill deeper holes generally required for contract, rental, or water well jobs. Their fast line speeds and ample tool capacities assure you "extra" income on the side.

Dependable, money-making performance 'round the clock is worth checking. Write today for the complete story. 66W56

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

At Flagstaff (Ariz.) field headquarters, the office staff handles routine business as the self-sustaining Western Pipeline spread moves through mountain country.

Pipeline . . .

Continued from page 27

speed. The pipe wrapping, therefore, must be electrically tight.

Backfill is being pulled in by a Cleveland backfiller, and by several auxiliary dozers working along the back end. Final cleanup, the moving of crib blocks and other debris off the site to leave a smoothed, permanent finished appearance is being kept closed up as tight as possible with the other operations.

When the big 34-in. line is completed and its 20-in. companion lateral extends down to Phoenix to carry the pulsing surge of compressed gas pounding through the line, a vital new link will have been wrought in gas delivery systems between production points and the west coast. Project officials, in fact, plan to use sections of the 34-in. line as they are completed between valve points. As a section is completed between valve points, it is cleaned by "blowing a pig" through the line. The newly constructed sections between valve stations then can be used either for extra gas storage or for carrying gas in case of an emergency interruption to the companion lines which will be connected with the newly laid artery. No enamel coating is placed inside a gas line—there is enough of an oil residue in gas to keep a line lubricated.

Field supervision is under R. L. McMillon, spread superintendent, who has two principal assistants, John R. Wells and Leon Pharris. Principal foremen on the line include C. L. Mann on right-of-way clearing; Blackie Tubbs, ditch foreman; Joe Wilson, rock foreman; Irving Simpson, project engineer; Van Benthuysen on bending; Leonard Stewart, pipe foreman; Jack Hadden, welding foreman; Rip Vann, dope foreman; Merle Scott, lowering-in; C. L. Warden, on cleanup; Toby Moore, master mechanic; and Jim Gray, office manager.

Riverview . . .

Continued from page 57

president and mine engineer, who worked five years with 20th Century plus 15 years with the Kentucky State highway department and with construction companies; Master Mechanic Luther Carr, who is a 14-year veteran; and Morris Kell, bookkeeper, who was on the 20th Century payroll for five years.

Jim and Hilary Hurst, the principal stockholders in the Riverview firm, spent 10 years in Pike County, at Winslow, Ind., with 20th Century before moving to Beaver Dam, Ky., for 20th Century in 1945.

It was while in Beaver Dam that they decided to take a chance on a business of their own. As a result, Riverview Coal Co. was incorporated in 1950 and a field five miles north of the present location was worked. In 1953, the brothers moved to the new location in order to obtain their present coal lease. Coal is still available at the old site. It

will eventually be mined and hauled to the coal screening plant now in use.

Hilary Hurst is optimistic about the future of the Riverview concern. "We certainly wouldn't have invested in the new walking dragline if we didn't figure there was at least a 10-year supply of coal in this field," he says. "At the rate the 480-W has moved dirt, we'll realize a profit on the investment in a relatively short time. After the machine's initial cost has been met, there will be plenty of coal left to be uncovered."

Literature . . .

Continued from page 58

International Harvester construction equipment in use on highway building jobs. Illustrated with on-the-job photos, the folder is divided into four parts, representing the east, west, south and north sections of the United States, and explains the part International's construction equipment plays in each section. Two pages are devoted to brief specifications of the entire I-H line of construction equipment. Ask for form CR-513-F.

Where to get: International Harvester Co., Construction Equipment Div., 180 N. Michigan Ave., Chicago 1, Ill.

New Movies . . .

Subject: **S-18 Scraper**

Content: Euclid has released a 16mm color, sound film, *Contractors Decision*, which features its S-18 scraper, an over-hung engine-type 18-yd. struck capacity machine with 300-hp Torqmatic drive, no-spin differential and hydraulic operation of the bowl. The film runs 10 minutes.

Where to get: Euclid dealers, regional offices or Euclid Div., General Motors Corp., Cleveland 17, Ohio.

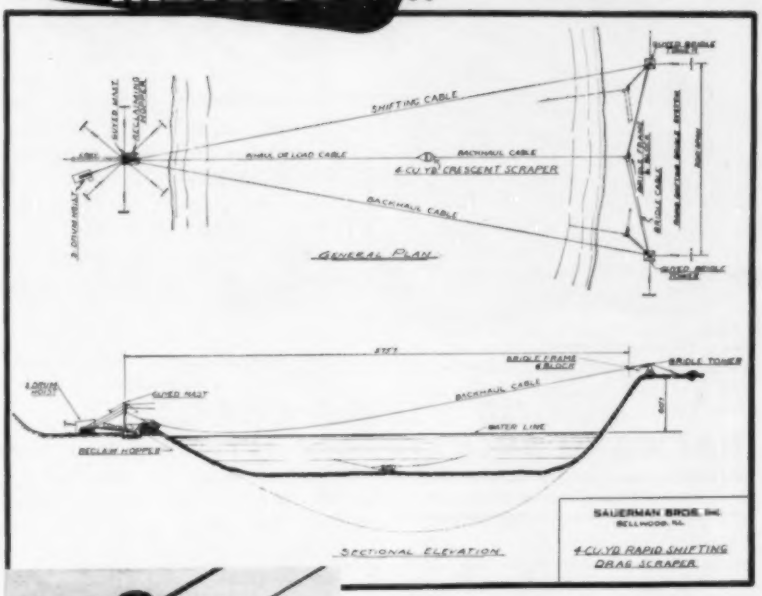
Subject: **Mack Trucks**

Content: Mack plans to release this fall a 27-minute color documentary film showing truck trailer convoys operating in roadless Arctic wastelands. The trucks, owned by the Alaska Freight Lines, Inc., transported steel and concrete for the United States Air Force radar station network rimming the Arctic circle. This network is known as the DEW line. Each unit grossed 161 tons for the 1,200-mile journey.

Where to get: Mack Trucks, Inc., 1355 W. Front St., Plainfield, N. J.

the SAUERMAN METHOD....

Scraper Machines Engineered to Your Operation



Above drawing was prepared for a specific drag scraper installation and does not represent maximum spans.

View shows rapid shifting bridle frame and all operating cables. Crescent may be seen in background conveying load to reclaiming hopper just in front of mast.

•

Contact Sauerman's engineering department for specific recommendations and information. No obligation.

Ask for Catalog A, Drag Scrapers—24 pages of job photos and specifications. Request Field Reports showing your material being handled by the low cost Sauerman Method.

The Sauerman Method works equally well over widely differing areas and span limits . . . on hills, swampy ground or underwater . . . handles any material a dragline can dig.

Every scraper machine is powered by a Sauerman Roller Bearing Hoist, especially designed to withstand sudden shocks and changes in speed.

When a rapid shifter is used, a third hoist drum is added to shift the bridle frame. The rapid-shifting bridle system (upper right of drawing) permits frequent shifting of the scraper's line of operation in non-caving material, shallow excavations or overburden.

Operating costs are lower—basically, it is cheaper to drag material than it is to lift and transport it. You eliminate the power costs of moving heavy machinery about the area. You pay only for pay loads—not dead weight. When expendable parts—sheaves, clutch or brake linings—are replaced, the machine is restored to practically new condition.

Sauerman can help you select the method of materials handling most profitable for your job—a system that will give you the lowest cost per cu. yd. handled.

SAUERMAN BROS. INC.

622 S. 28th AVE. BELLWOOD, ILL.

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

In a Hayward, there's no contact between the closing mechanism and the gravel or other materials handled. To be sure—this "no contact" feature is only one advantage. But a very important one to you—since it means much less wear, reduced upkeep, and a significant dollar-saving in bucket maintenance.

The Hayward Company, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLER

famous for performance since 1888

Notes from the Manufacturers

American Hoist and Derrick Co., St. Paul 1, Minn., has purchased outright the complete plant, certain product inventory and major facilities of the Lebus Rotary Tool Works, Inc. of Longview, Tex., manufacturer of drop forged tools, including oil field snatch blocks and load binders. Products of the plant will be merchandised through the same distributors now handling the company's Crosby-Laughlin line.

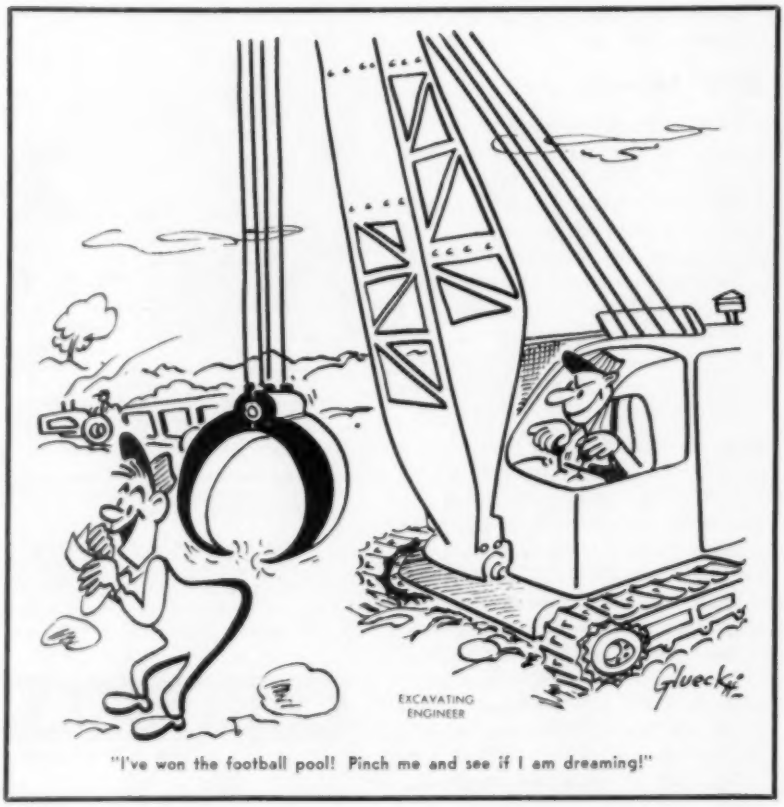
Bucyrus-Erie Co., South Milwaukee, Wis., reports that its distributor in southern Florida since 1945, Llewellyn Machinery Corp., has opened a branch office in Tampa to cover an expanded territory. The firm is covering central Florida from the Tampa location, offering the full line of ⅜ to 4-yd. convertible excavators and cranes; 15-ton and 25-ton Transit Cranes; 5-ton and 9-ton truck mounted, all-hydraulic Hydrocranes; and dragline buckets. The new territory includes the following counties: Pasco, Hardee, Lee, Hillsborough, Highlands, Pinellas, Manatee, DeSoto, Sarasota, Charlotte, Citrus, Hernando, Sumter, Osceola and Indian River. These are in addition to St. Lucie, Martin, Palm Beach, Broward, Dade, Monroe, Collier, Hendry, Glades and Okeechobee, the counties that Llewellyn serves from its main office in Miami. The Tampa headquarters are at 4630 N. West Shore Blvd. In Miami, sales of general purpose excavators and cranes only are handled from Llewellyn's earthmoving division office at 3127 Douglas Rd. Hydrocrane and Hydrohoe sales are conducted by the firm's general office at 1030 N. Miami Ave.

Colorado Fuel and Iron Corp., New York, N. Y., has moved its Philadelphia (Pa.) district warehouse and sales office to new and larger headquarters at 225 W. Erie Ave., in the center of the city.

Electric Steel Foundry Co., Portland, Ore., has appointed Joe E. McQuaid as manager of the general sales department. He has been with the company 14 years.

Euclid Div., General Motors Corp., Cleveland, Ohio, has appointed two new authorized dealers for the full line of Euclid scrapers, rear dumps, bottom dumps and crawler tractors. Anderson Equipment Co., Pittsburgh, Pa., will handle a territory embracing western Pennsylvania and the West Virginia counties of Brooke, Hancock, Ohio and Marshall. Archer Tractor and Machinery Co., 1118 S. Main St., Salt Lake City, Utah, will handle Utah, southwestern Wyoming and the Nevada counties of Elko and White Pine. Euclid also has made the following additions to its staff of district sales representatives: Blane Currence, sales territory of Colorado, Wyoming, Nebraska, Arizona and western Texas; Donald Stone, Illinois, Wisconsin, eastern Missouri, eastern Iowa and Indiana's Lake County; William H. Schwagmeyer, Florida, Georgia, and Alabama; Mark Coons, eastern Tennessee, North Carolina and South Carolina; and Kenneth Underwood, New York state, New Jersey.

General Electric Co., Metallurgical Products Dept., Detroit, Mich., has



"I've won the football pool! Pinch me and see if I am dreaming!"

named A. F. Doddrodt as Pacific Northwest sales representative, with headquarters in Seattle, Wash.

Koehring Co., Milwaukee, Wis., has named three new district representatives for itself and two of its subsidiary firms, Parsons Co., Newton, Iowa, and Kwik-Mix Co., Port Washington, Wis. H. R. Powers has been assigned the Pacific Northwest area covering the states of Washington, Oregon, Idaho and Montana. C. M. Andresen has been assigned the Southwest District area covering Texas, New Mexico, Louisiana, Oklahoma and Mexico. L. J. Meyers will cover the South Central area—Illinois, Indiana, Kentucky, Tennessee, Missouri and Mississippi.

Leschen Wire Rope Div., H. K. Porter Co., Inc., St. Louis, Mo., has appointed Maurice M. Muse as a district sales representative. His territory includes the eastern two-thirds of Kentucky and Tennessee and the northern half of Alabama.

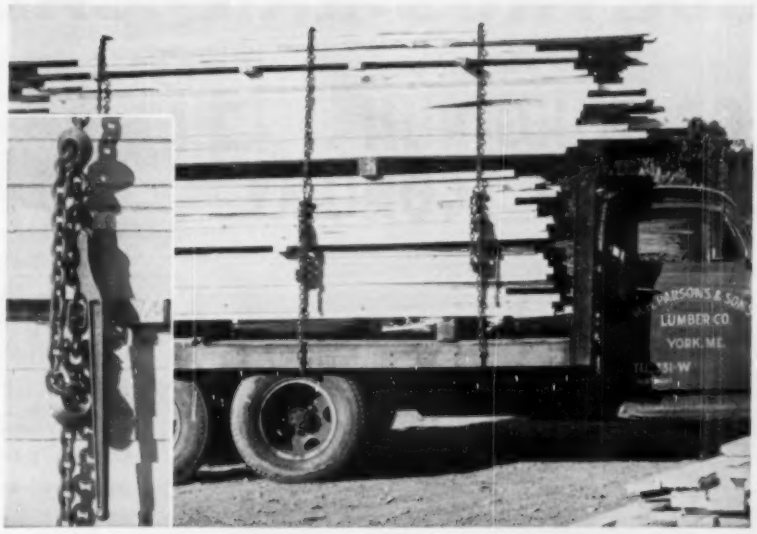
LeTourneau-Westinghouse Co., Peoria, Ill., has announced a $9 million expansion program. Major aspect of the program is the building at Peoria of a 300,000 sq. ft. modern factory building to adjoin the site of one of the present plants. Cost of the new factory building and tooling at Peoria will be more than $6 million. Completion is scheduled for April 1, 1957. Simultaneously, the company is expanding its plant operations at Toccoa, Ga., and at Indianapolis, Ind.

Mack Trucks, Inc., Plainfield, N. J., has acquired the truck business of Brockway Motor Co., Inc., Cortland, N. Y. Mack will take over all of Brockway's manufacturing, sales and service facilities under terms of a special purchase-rental agreement and will carry on the business as a separate division. Brockway was first formed in 1875 as a carriage maker.

Manitowoc Engineering Corp., Manitowoc, Wis., has appointed the State Machinery & Supply Co., 1005 Meeting St., West Columbia, S. C., as an exclusive distributor in South Carolina for its line of shovels, cranes and draglines.

Marion Power Shovel Co., Marion,

Continued on page 66



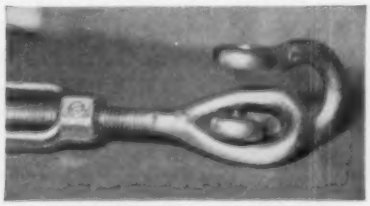
LOADS SAFELY BOUND

Safety conscious contractors tie down their truck loads of construction material with Laughlin Load Binders! There's no chance for injury or loss because the smooth lever action takes up 4½-inches of chain—holds lumber, piles, pipe, sheet material positively—safely! This tough, drop forged and heat treated binder is the most versatile available—and it's made for the strongest chain! One Laughlin binder will handle four chain sizes! Merely switch Clevis Grab Hooks to fit the chain you're using! Keep Laughlin Clevis Grab Hooks on hand to fit your chains—then there'll be no delays!

100% HOLDING POWER

When genuine Crosby* Clips secure wire rope rigging and tackle, men and materials are 100% safe! Positive gripping power gives confidence to workers, and confidence means top working efficiency. High strength steel is formed into the world-famous "Red U-Bolt"*. High wings on the drop forged base hold the rope securely in place. Look for the "Red U-Bolt"! You'll see it used on ropes of all sizes, because only Crosby offers a complete range of sizes to fit ⅛" to 3" diameter ropes!

*REGISTERED TRADEMARK



AN EYE FOR SAFETY!

. . . that's the eye design that was originated by Laughlin engineers. The ear of a shackle only one size smaller slips through the pear shaped eye—a design that conforms more closely to the line of pull—makes Laughlin Turnbuckles stronger and safer! Hex ends on the hefty body make take-up fast and easy. Weldless, hot galvanized turnbuckles, forged from special steel, are available from Crosby-Laughlin Distributors in a variety of end fittings and in sizes from ¼" x 4" to 2¾" x 24"!

Stocked and sold by leading distributors everywhere

CROSBY-LAUGHLIN DIVISION

American Hoist and Derrick Company

FORT WAYNE, INDIANA

BUCYRUS-ERIE CHURN DRILLS

FOR LONG-RUN DRILLING ECONOMY

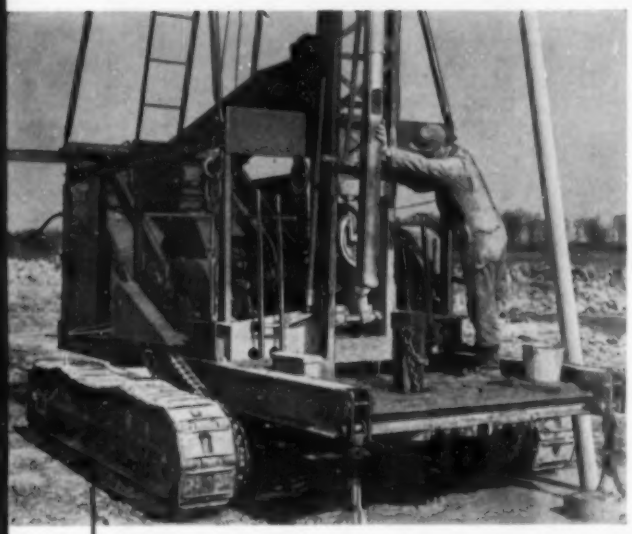
Cost records of many experienced quarry operators show that in some types of formations Bucyrus-Erie churn drills put down blast holes far more economically than any other type of drilling equipment.

Swinging heavy tool strings up to 6000 pounds, these drills have the punch needed to lick stubborn formations. Whatever type of power you select—gasoline, diesel or electric—you get a big heavy-duty power unit that easily handles the tool load. Efficient power application keeps fuel or current consumption low.

Bucyrus-Eries are built to take the shock of rock drilling in stride, too. Tough rubber discs in the derrick head put snap into the drilling motion and absorb shocks before they reach machinery. Rubber insulated spudding beam and heel sheaves further dampen the vibrations of drilling. The drilling machinery is supported by an all-steel, all-welded box-type frame that insures perfect alignment, low maintenance, long life.

Team up all these advantages with full mobility and easy control and you've got a rig that can't be beat for productivity and dependability. Four models to choose from: 50-T, for 9- to 12-in. holes; 29-T for 6-⅝- to 9-in. holes; 27-T, for 6- to 6-⅜-in. holes; and 22-T, for 5-⅜- to 6-⅝-in. holes. Write today for complete information on the model of your choice.

46B56C



Small initial cost plus low upkeep combine to make Bucyrus-Erie churn drills ideal for many quarries. This 27-T drills 7-in. hole for National Lime and Stone Co., Marion, Ohio.

At Lowell, Vermont, a 29-T drills 6-in. holes in serpentine rock. Average hole depth is 100 feet.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

76th Year of Service
to Men Who Shape the Earth

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

S-6075 (C) Bucyrus-Erie Model 10-B, ⅜ yd. shovel on crawlers; powered by Buda gasoline engine; engine has just been overhauled; good running condition.
PRICE F.O.B. Louisville, Ky. $4500

S-2917 (C) Insley Model K-12 dragline, ½ cu. yd. capacity with 45' boom, fairleads and long and wide crawler tracks; powered by gasoline engine.
PRICE F.O.B. Evansville, Ind. $7500

BRANDEIS MACHINERY & SUPPLY CO.
P. O. Box 1705 Melrose 7-4741
Louisville, Kentucky

MANITOWOC MODEL 3500 STRIPPING SHOVEL, S/N 3602; equipped with 45' boom, 34' sticks and 2 cubic yd. dipper; powered with Caterpillar D-17000 diesel engine new in 1951; machine is in good operating condition. Price $35,000 as is, where is, and can be inspected at Sunnyhill Coal mine near New Lexington, Ohio.
Box 3692

USED EQUIPMENT SHOVELS — CRANES — DRAGSHOVELS

⅜ yd. DRAGSHOVEL Model 10-B Bucyrus-Erie, Buda gas engine, like-new crawlers, rebuilt dipper, good working condition.

⅜ yd. QUICKWAY MODEL J HOE-SHOVEL COMBINATION on rubber, very good condition, priced reasonably.

¾ yd. HEAVY DUTY CRANE-CLAMSHELL COMBINATION Model 40 General, Buda gas engine, excellent condition, recently completely rebuilt.

1 yard SHOVEL Model LS-90 Link Belt Speeder, Waukesha gas, used very little, like-new condition.

½ yd. UNIT WAGON CRANE-CLAM COMBINATION on self-propelled rubber tired carrier. This machine is disassembled and will be sold at a real bargain "as is" or we will assemble.

Above equipment offered subject to prior sale.

STOP IN AT
J. P. WAITE, INC.
3304 W. Pierce Street
Milwaukee 15, Wisconsin
or call EVergreen 4-1900

SMALL SHOVELS, CRANES, DRAGLINES — UP to 2½ YDS.

Best buy in U.S.A. ⅜ yard shovel; machine mounted 6x4 tandem International truck; clean, excellent condition; easily converted to crane, backhoe, or dragline. Worth $4000. Sacrifice $2000. McCandless Construction Co., 1625 E. Kearney St., Springfield, Mo.

One Bucyrus-Erie Model 55-B crane, Atlas diesel, 80' boom; has had little use and is in fine condition; excellent for dragline, pile driver or crane work. Price $19,000. Write or call: Louis Julian, 330 Pleasant St., Watertown, Mass. Phone WAtertown 4-2900.

Northwest 25 ¾ yd. shovel with 24" treads and G.M. 3-71 diesel engine; new 1949.
Price f.o.b. Fletcher, N. C. .....$ 7,500
Allis-Chalmers TS-300 motor scraper with Buda diesel engine 12,000
Allis-Chalmers TS-200 motor scraper with A-C diesel engine 18,000

E. F. CRAVEN COMPANY
Greensboro North Carolina

Bucyrus-Erie 22-B, Caterpillar D318 engine; machine used only part time; absolutely perfect throughout; must see to appreciate; ¾ yd. rock bucket; excellent undercarriage; financing available. Call or write Midland Machinery Co., Chillicothe, Mo. Phone 280.

One Model 150 P&H one-half yard Crawler Type Dragline; purchased new 1950; now has Buda diesel engine. EDGAR PLASTIC KAOLIN CO., Edgar, Fla. Phone Hawthorne 2831.

MISCELLANEOUS EQUIPMENT

One used Bucyrus-Erie Model 29-B shovel front.

BRANDEIS MACHINERY & SUPPLY CO.
Brook & Warnock Sts. P. O. Box 1705
Louisville 1, Kentucky

1—Bucyrus-Erie, 2-cu. yd. dipper complete with bail for a model 54-B high lift tubular stick shovel, in good condition.
1—Esco 2½-cu. yd. dipper complete with bail for a model 1201 Lima high lift shovel, in good condition.
1—Page RDH 2½-cu. yd. dragline bucket complete with chains, teeth, padlock and other hitch parts; all in good condition.

JOHN BOOTH, INC.
Phone 1400 Carbondale, Pa.

2—Model 27-T Bucyrus-Erie blast hole drills, crawler mounted, chain and sprocket drive, equipped with telescopic derrick and built-in tool wrenches; powered by Int'l. gasoline motors, water cooled, 4-cylinders with twin disc clutch; with the following accessory equipment for 6¾" drilling: combination and regular drill stems, wire rope sockets, drill bits and fishing tools; also one spare jack shaft completely installed, will fit either unit.
1—#8 Bucyrus-Erie bit dresser; complete without motor.
1—Coke furnace; with Champion electric blower.

All items are located at:
W. E. GRAHAM & SONS QUARRY
P. O. Box #4207 N. Sta.
Winston-Salem, N. C.

MISCELLANEOUS EQUIPMENT

Two Bucyrus-Erie Model 22-B shovel fronts, ¾ yard capacity. $2500 each, F.O.B. Louisville, Kentucky.

BRANDEIS MACHINERY & SUPPLY CO.
Brook & Warnock Sts. P. O. Box 1705
Louisville 1, Kentucky

Ingersoll-Rand "Quarrymaster" No. 11629, Model QM-2; series KA-500 compressors; air-motor-driven hydraulic pump and valve unit for leveling; dust collection unit; utility air hoist; powered by Ingersoll-Rand diesel engines; 19" treads; 45' 11½" high tower; 40' steel 3¼"x2½" drill rods; 2"x3" joints API; 6" bits—approximate net weight 65,000#. FAUZIO BROTHERS, NESQUEHONING, PA.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

Page 620 dragline, S/N 165, new in 1943; has 120' boom and 5 yd. bucket; machine in good working condition, but idle since November 1955; located near Pittsburgh, Pa. Price $50,000.
Box 3698

Bucyrus-Erie 200-W diesel dragline shipped in 1950; 125 ft. boom, 6 yd. heavy duty and 7 yd. light weight buckets; some spare parts included; good mechanical condition. Location Melbourne, Australia.
Box 3682

Page 625 diesel dragline, S/N 242, new in 1951, has 150' boom and 9 yd. Page bucket; machine in A-1 condition; available now; located near Pittsburgh, Pa. Price $225,000.
Box 3697

Lima 2400 dragline equipped with 110' boom, two 7-yard Hendrix HS buckets, one 6-yard ESCO bucket, Kohler light plant; machine powered with Caterpillar D-397 diesel engine; 63" wide treads; long caterpillar frames; machine shipped September 1950; completely overhauled June 1955; engine completely overhauled April 1955; Approximately $5000 in spare parts available; Price, as is where is. $115,000.
Box 3677

Bucyrus-Monighan Model 6160 Diesel Dragline 160' boom, several buckets 8 to 10 cubic yd. sizes. Base 36' diameter, engine Fairbanks-Morse diesel, separate Caterpillar engine for swing generator, approximately $50,000 worth of new and used parts.

One all-steel bulkheaded spud barge, 175' x 49', 6" x 11' deep, 3 drum hoist, ample fuel and water storage capacity, will clear all Mississippi River locks and meets U. S. Coast Guard requirements.

Will sell dragline alone or in combination with barge. Will not sell barge alone unless dragline has been sold.

For further details or inspection please reply to:
Box 3704

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

GOOD USED COAL STRIPPING EQUIPMENT

9-W Bucyrus-Erie Drag, 165', 10 yd.
625 Page Diesel Drag, 150', 10 yd.
625 Page Diesel Drag, 160', 9 yd.
6160 Bucyrus-Monighan Elec. Drag, 160', 8 yd.
621 Page Diesel Drag, 135', 5 yd.
621 Page Diesel Drag, 125', 7 yd.
7200 Marion Drag, 120', 7 yd.
200-W Bucyrus-Monighan Drag, 140', 6 yd.
2400 Lima Drag, 120', 6 yd.
4500 Manitowoc Drag, 140', 4 yd.
620 Page Diesel Drag, 115', 6 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus-Erie Elec. Drag, 115', 5 yd.
111-M Marion Drag, 80', 5 yd.
1055 P&H Drag, 110', 4 yd.
1201 Lima Drag, 85', 3 yd.
3500 Manitowoc Drag, 80', 2½ yd.
1001 Lima Drag, 80', 2½ yd.
955 P&H Drag, 100', 2½ yd.
54-B Bucyrus-Erie Drag, 85', 2½ yd.
80-D Northwest Drag, 65', 2½ yd.
170-B Bucyrus-Erie Elec. 6½ yd. Shovel
1600 P&H Elec. 6 yd. Shovel
1500 P&H Elec. 5 yd. Shovel
120-B Bucyrus-Erie Elec. 4½ yd. Shovel
111-M Marion 4 yd. Elec. Shovel
111-M Marion 4 yd. Diesel Shovel
1055 P&H 3½ yd. Shovel
1201 Lima 3½ yd. Standard Shovel
111-M Marion 3 yd. High Lift Shovel
1201 Lima 2½ yd. High Lift Shovel
3500 Manitowoc 3 yd. High Lift Shovel
80-D Northwest 2½ yd. Shovel
54-B Bucyrus-Erie 2½ yd. Shovel
38-B Bucyrus-Erie 1½ yd. Shovel
25 Northwest ¾ yd. Shovel
22-B Bucyrus-Erie ¾ yd. Shovel
Unit 1020 ¾ yd. Shovel
802 Lima Cranes
600 Reich Heavy Truck Mounted Rotary Air Drills (Both Lever Arm and High Mast)
58-BH Joy Champion Rotary Air Drills
Quarrymaster Drill — with 2-500 c.f. Compressors
Also 42-T, 29-T and 27-T Well Drills

EUCLID TRUCKS—
Many to Choose From

FRANK SWABB EQUIPMENT CO., INC.

313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

EQUIPMENT WANTED

WANTED
One 50' Boom for Bucyrus-Erie Model 29-B Machine.
Back hoe (dragshovel) front end for Bucyrus-Erie Model 20-B or 22-B.
BRANDEIS MACHINERY & SUPPLY CO.
Brook & Warnock P. O. Box 1705
Louisville 1, Kentucky

WANTED
STRIPPING SHOVEL
22 TO 45 YARDS
FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

HELP WANTED

CONSTRUCTION EQUIPMENT SALES ENGINEER

Off highway haulage equipment department. Opportunity for sales engineer or construction man 30 to 35 years of age in established territory for AAA-1 construction distributor. Give full details of background and experience in first letter to

P. O. BOX 1705 Louisville, Ky.

POSITIONS WANTED

Superintendent available; 30 yrs. experience and qualifications covering all types of sewers, water lines, highways, airports, heavy and light excavating, earth fill dams; know cost, plans and specifications, materials, labor and modern equipment; honest, sober and reliable; best of health and a pusher; available for any part of the U.S.A. Box 3702

If you are Buying or Selling Used Equipment, this is the place to let the Excavating Industry know about it.

Notes . . .

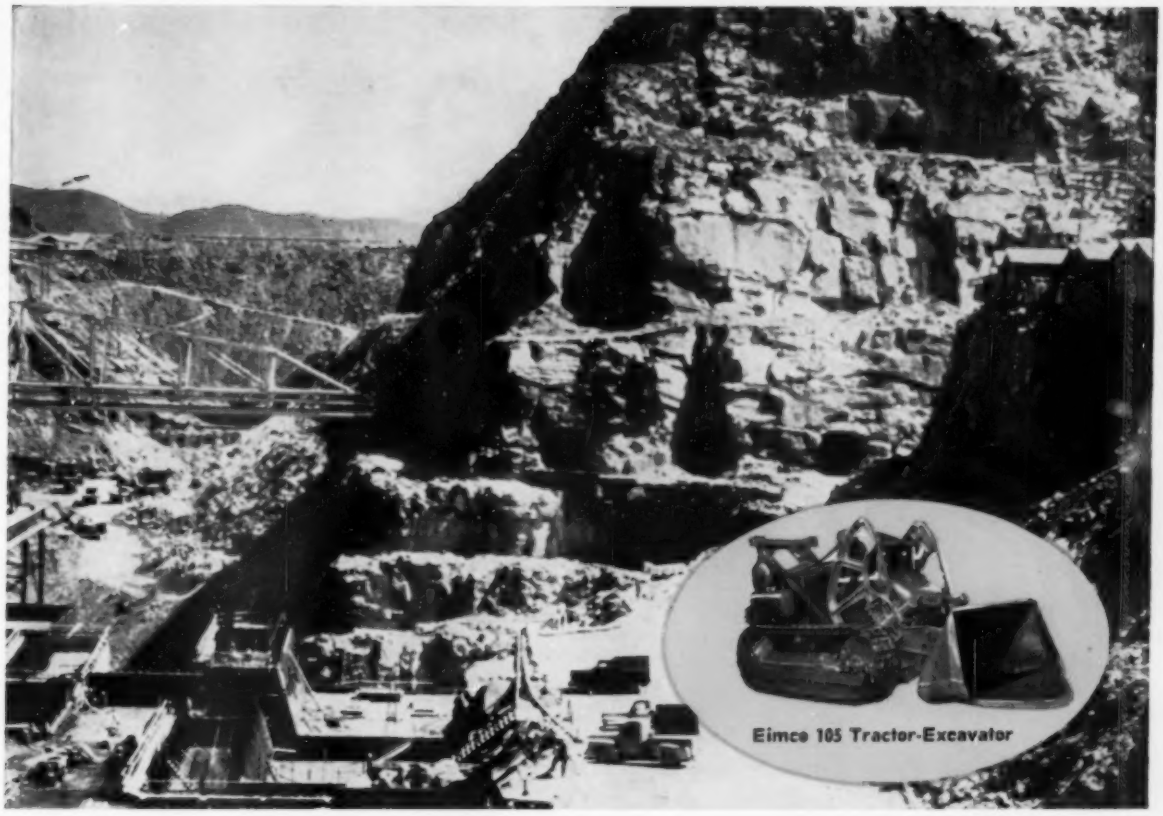
Continued from page 63

Ohio, has named Walter Pierson as assistant manager, Mining Division. He joined Marion in 1950.

Raybestos-Manhattan Inc., Manhattan Rubber Div., Passaic, N. J., has created a new eastern sales region. The new region combines the New York, Philadelphia and North Jersey districts. R. F. Teeling has been appointed regional sales manager. He joined the Manhattan Rubber Div. in 1911. He was made assistant branch manager, North Jersey sales, in 1940, becoming manager in 1948. In his new capacity he will co-ordinate the activities of the New York, Philadelphia and North Jersey districts.

Stoody Co., Whittier, Calif., has appointed L. P. Fitzsimmons to its staff of field representatives with a territory embracing Virginia, North Carolina, South Carolina, Georgia, Alabama and Florida. This territory formerly was part of the territory handled by Frank Clark. All of Louisiana and the eastern two-thirds of Texas have been added to Clark's territory. Stoody has appointed Andrew H. Gregg as a representative in western Canada. Harry Cerf has been sent to Mexico City to supervise field work throughout Mexico, west Texas and southern New Mexico.

David White Instrument Co., Milwaukee, Wis., surveying and photographic instrument manufacturer, has revised its corporate name to better identify itself with its products for engineering, construction, farm and photographic fields. The firm's subsidiary company for distributing photographic equipment will continue as Realist, Inc.



INDIA – EIMCO 105's KEEP GRUELLING SCHEDULE

Two Eimco 105 Tractor-Excavators have each worked 8,000 hours in 12 months to keep progress on schedule at a huge dam project in India.

The machines have received intelligent maintenance and repairs have been small.

Eimco 105 Tractor-Dozer

At work on diversion, penstock and highway tunnels, trained Indian crews operating the 105's are doing an excellent job of tunnel driving. In some instances, advance for the size of tunnel being excavated may establish new world records.

"Eimco 105's are preferred equipment to use for tunnels of this type," says one official of a contracting firm. "The transmission, clutches and drive on both machines have not been touched in 8,000 hours of operation. They are in good condition and we expect them to last many more years."

Have you considered why the Eimco 105 is "preferred equipment" to contractors of huge dam, tunnel and road projects in the export market?

It's becauuse their dependability is reflected through their engineered strength to stay on the job around the clock – day in and day out.

The Eimco 105's dependability eliminates the necessity of a sizeable parts depot. Eimco's are built to 100,000 hour standards for service in remote areas. Time saved by Eimco's working continuously with no down time for repairs is a big factor in selecting equipment.

Conditions being equal, Eimco 105's will produce more at less cost and in less time than comparative equipment. Let Eimco show you how this versatile unit can outperform and out-work heavier, more expensive units.

See the Eimco 105 before you buy any crawler tractor equipment.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Cleveland, Ohio Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B-214

New CAT* No. 9 Ripper FOR THE Mighty D9!

First choice for push-loading, the D9 is now more versatile than ever. The new No. 9 Ripper lets the D9 rip tough or frozen material between loading cycles. Faster, easier scraper-loading cuts time and costs.

TRACTOR-MOUNTED

The tractor-mounted No. 9 Ripper utilizes the weight of the D9 to force the teeth into hard material. No need for ballast or extra weights. The hydraulically operated ripper affords maximum maneuverability because it is tractor-mounted.

"LIVE DRIVE" HYDRAULIC PUMP

New No. 50 Hydraulic Control has a constant power pump that supplies the capacity to raise or lower ripper teeth *independently* of flywheel clutch or torque converter.

TWO RIPPING POSITIONS

Shanks may be pinned in either of two ripper positions which provide either maximum ground clearance when raised or maximum penetration (up to 28") when lowered.

TRIPLE TEETH

Use one, two or three. Any or all of them can be swung up and pinned out of the way. Teeth pivot 10° to either side. This permits tractor steering and smoother ripping through rocks. Shanks are heat-treated alloy steel, with hardened alloy cast steel boots. Points are hardened cast steel, *pin-attached* for easy replacement.

MANY OTHER IMPORTANT FEATURES!

Now the new No. 9 Ripper makes the 'King of the Crawlers" an even more profitable and versatile machine. Mail the coupon for full details, or call your nearby Caterpillar Dealer. And remember, you can count on him for reliable service, and for parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN HEAVY-DUTY TRACTOR RIPPERS

MAIL TODAY!

Caterpillar Tractor Co., Dept. D-94, Peoria, Illinois
I would like more information on the new No. 9 Ripper

*Name*_____

*Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____